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Bulletin 92



BIBLIOGRAPHIC INDEX OF AMERICAN
ORDOVICIAN AND SILURIAN
FOSSILS

VOLUME 1

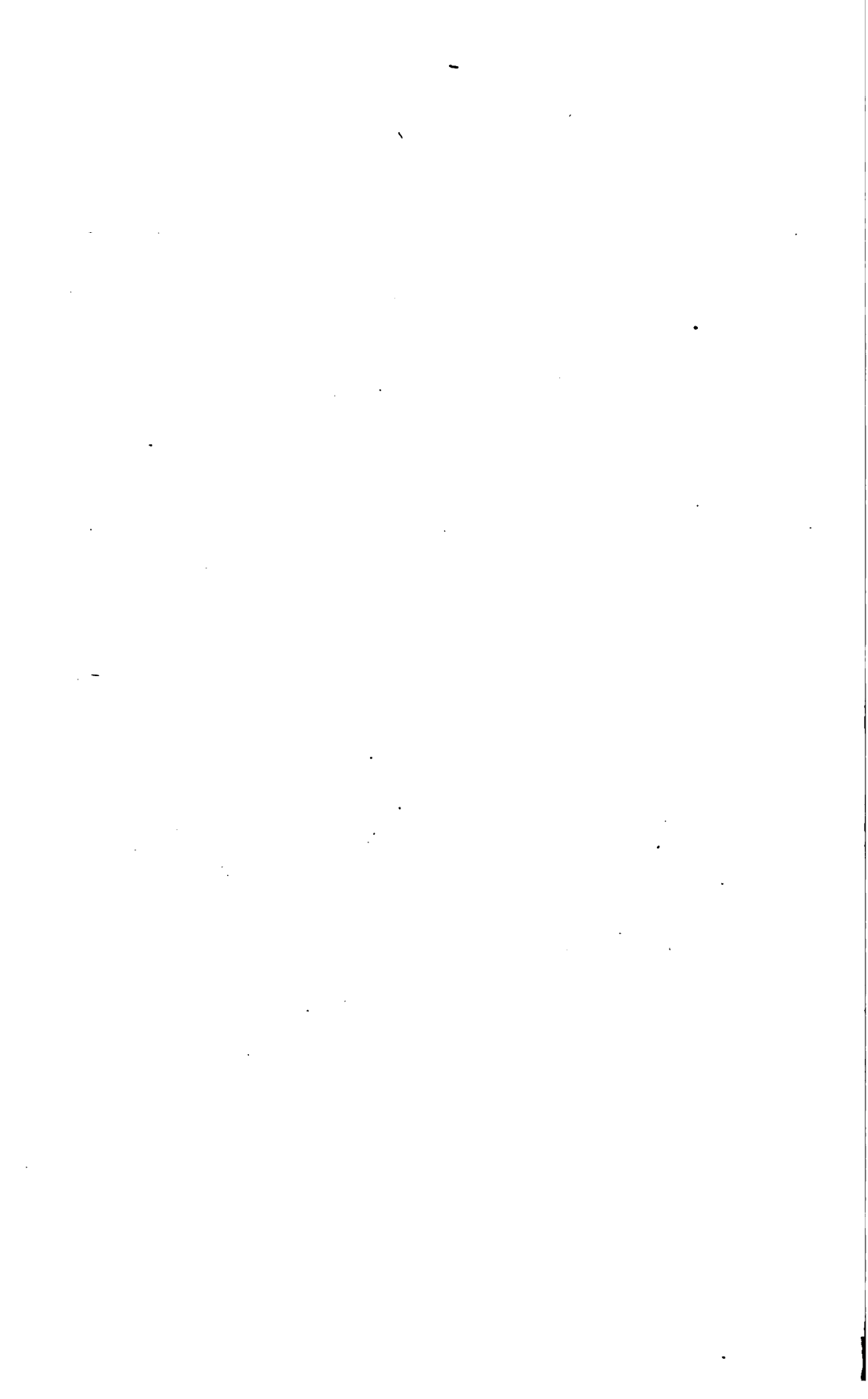
BY

RAY S. BASSLER

Curator of Paleontology, United States National Museum



WASHINGTON
GOVERNMENT PRINTING OFFICE
1915



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UNITED STATES NATIONAL MUSEUM
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BULLETIN OF THE UNITED STATES NATIONAL MUSEUM.

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ADVERTISEMENT.

The scientific publications of the United States National Museum consist of two series—the *Proceedings* and the *Bulletins*.

The scientific publications of the United States National Museum are intended primarily as a medium for the publication of original, and usually brief, papers based on the collections of the National Museum, presenting newly acquired facts in zoology, geology, and anthropology, including descriptions of new forms of animals, and revisions of limited groups. One or two volumes are issued annually and distributed to libraries and scientific organizations. A limited number of copies of each paper, in pamphlet form, is distributed to specialists and others interested in the different subjects as soon as printed. The date of publication is printed on each paper, and these dates are also recorded in the tables of contents of the volumes.

The *Bulletins*, the first of which was issued in 1875, consist of a series of separate publications comprising chiefly monographs of large zoological groups and other general systematic treatises (occasionally in several volumes), faunal work, reports of expeditions, and catalogues of type-specimens, special collections, etc. The majority of the volumes are octavos, but a quarto size has been adopted in a few instances in which large plates were regarded as indispensable.

Since 1902 a series of octavo volumes containing papers relating to the botanical collections of the Museum, and known as the *Contributions from the National Herbarium*, has been published as bulletins.

The present work forms No. 92 of the *Bulletin* series.

RICHARD RATHBUN,
Assistant Secretary, Smithsonian Institution,
In charge of the United States National Museum.

WASHINGTON, D. C., July 21, 1915.

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P R E F A C E.

The literature of systematic natural history has become so voluminous that it is almost impossible for the student to attain good results without the aid of some kind of a compilation. In Paleozoic paleontology the need of such an index is perhaps greatest for the fossils of the Ordovician, Silurian, and Devonian periods for the reason that the Carboniferous has been covered up to 1898 by Weller's Bibliographic Index of North American Invertebrates (Bulletin 153, United States Geological Survey), and the numerous monographs of the Secretary of the Smithsonian Institution upon Cambrian geology and paleontology have assembled the fossils of that period. Dr. E. M. Kindle, while a member of the United States Geological Survey, prepared an index of Devonian fossils which will probably be published in the future. In the course of work upon the paleontologic collections of the United States National Museum the present author has specialized upon the Ordovician and Silurian, and it therefore became appropriate for him to prepare the bibliographic index which is herewith placed at the service of his fellow workers.

The great amount of labor required to complete an index of this size and character in a few years is very evident, and the work could not have been brought to a speedy conclusion had the author not had the help of two indefatigable and intelligent assistants, Miss Florence George and Miss Adelaide C. Quisenberry, to both of whom he is under great obligations. The refinement of stratigraphic designation consequent on the great advance in knowledge of Ordovician and Silurian stratigraphy in the last decade has necessitated a careful examination of all described fossils in order to locate them accurately in the time scale. In this work and also in the task of clearing up the synonyms the author is indebted to many friends for generous help, particularly to Dr. Rudolph Ruedemann, Mr. Frank Springer, Dr. P. E. Raymond, and Prof. W. H. Twenhofel. To Dr. E. O. Ulrich, whose knowledge of American Paleozoic paleontology and stratigraphy, whether in manuscript form or otherwise, has ever been at the command of the writer, he is under special indebtedness. The writer has also had access to a set of references to American Paleozoic fossils covering part of the literature up to 1906, prepared under the direction of Prof. Charles Schuchert by Miss M. W. Moodey and Mr. J. M. Nickles. This set was of greatest use for its foreign generic references, but in order to insure as few errors as possible these references were again checked up with the literature covered by them.

The terms Ordovician and Silurian in the title of this work are employed in a broad sense, so as to include formations which, although considered of Cambrian or Devonian age by some, are still placed in the Ordovician or Silurian by others. The particular cases in the Silurian are those of the upper Monroan and the Keyser formations, both of which the author would place in the Devonian. With the Ordovician the author has catalogued the Ozarkian and Canadian faunas, both of which divisions are regarded by Ulrich, Schuchert, Walcott, and others, the writer included, as of systemic value. In fact, then, the present index is intended to cover all American fossils which are known to occur in formations regarded as probably younger than those which are definitely decided to be of Cambrian age, and older than those now generally considered to belong to the Devonian period.

Every effort has been made to eliminate errors, but it is inevitable that many will be found. As the author intends to keep this index up to date for use in the United States National Museum, all corrections will be greatly appreciated. A chapter devoted to the literature of American Ordovician and Silurian paleontology was prepared for this work, but was omitted when it was found that this subject will be included in a forthcoming bibliographic publication by the United States Geological Survey.

The citations have been brought up to the close of 1914 with the exception that two important monographs (Schuchert, Revision of Paleozoic Stellerioidea, Bulletin 88, United States National Museum, and Springer, Monograph Crinoidea Flexibilia, Smithsonian Institution), then in press or ready for publication, were included.

Following the bibliographic list proper which makes up the greater part of the work (pages 1 to 1342), the author has added an index of specific names (pages 1343 to 1406), showing under what generic or other combination any particular name has been employed. Then, in order that the biological classification of any doubtful genus may be readily ascertained, a biological classification (pages 1407 to 1428) and an alphabetical list of genera (pages 1429 to 1440) are given. Finally, as an aid in recalling the position of the many geological formations cited, an alphabetical list of American Ordovician and Silurian formations, indicating their approximate place in the time scale (pages 1511 to 1521), and correlation tables covering the most important areas of fossiliferous rocks, are given. With the help of these several features, in addition to the bibliographic references, it is believed that all the needs of the student with one exception are covered. This exception is the failure to indicate the characteristic species of each formation in the faunal lists. As knowledge of the early Paleozoic faunas increases it is becoming more evident that a species is characteristic of a formation only in a certain area of deposition and when considered in connection with the associated organisms. As the origin of the fauna, the lithology of its inclosing sediments, and still other factors must also be considered in determining such species, it has not seemed advisable to attempt to indicate them at present.

The bibliographic citations are abbreviated as far as possible without sacrificing clearness, and the horizon and locality of each species are condensed into as few words as needed. The type locality is cited first, and in cases where a species occurs in several formations the name of the particular formation follows in parenthesis each locality listed. It will be noted that this index is also a register of the types of Ordovician and Silurian fossils contained in the United States National Museum. The type terms holotype, paratype, and cotypes, for primary types, and plesiotypes, for all supplemental types, employed throughout this work are those adopted in the division of paleontology in the United States National Museum. All valid species are printed in heavy-faced type. The cross references are condensed as much as possible, and in cases where the generic cross reference will suffice for the species under it, those for the latter are not given.

BIBLIOGRAPHIC INDEX OF AMERICAN ORDOVICIAN AND SILURIAN FOSSILS.

BY RAY S. BASSLER

Curator of Paleontology, United States National Museum.

BIBLIOGRAPHIC LIST OF GENERA AND SPECIES.

ACACOCRINUS Wachsmuth and Springer.

Genotype: *A. elrodi* Wachsmuth and Springer.

Acacocrinus (subgenus of *Habrocrinus*) Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 21, 1897, p. 515.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 730.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 194.

Acacocrinus americanus Wachsmuth and Springer.

Acacocrinus americanus Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 21, 1897, p. 516, pl. 34, fig. 15a, b.
Niagaran (Laurel): St. Paul, Indiana.

Acacocrinus elrodi Wachsmuth and Springer.

Acacocrinus elrodi Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 21, 1897, p. 515, pl. 34, fig. 16.
Niagaran (Waldron): Hartsville, Indiana.

ACANTHALOMA Conrad. See *Ceratocephala* Warder.

ACANTHOCLEMA Hall.

Genotype: *Trematopora alternata* Hall.

Acanthoclema Hall, 5th Ann. Rep. State Geol. New York for 1885, 1886, expl. pl. 25.—Hall and Simpson, Pal. New York, 6, 1887, p. 15.—Miller, N. A. Geol. Pal., 1889, p. 291.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 402, 661.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 552.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 44.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 58; Zittel-Eastman Textb. Pal., 1913, p. 344.

Acanthoclema asperum (Hall).

Trematopora aspera Hall, Pal. New York, 2, 1852, p. 154, pl. 40 A, figs. 10a-c. *Batostomella? aspera* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 189. *Acanthoclema asperum* Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 58, pl. 21, figs. 3-5; pl. 24, figs. 7-9; pl. 25, figs. 17-20.
Clinton: Lockport, Rochester, etc., New York; Grimsby, Hamilton, etc., Ontario (Rochester); Osgood, Indiana (Osgood).
Plesiotypes.—Cat. No. 35756, U.S.N.M.

ACANTHODICTYA Hinde.Genotype: *A. hispida* Hinde.

Acanthodictya Hinde, Trans. Roy. Soc. Canada, 7, sec. 4, 1890, p. 47.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 666.—Dawson, Trans. Roy. Soc. Canada, 2d ser., 2, sec. 4, 1896, p. 110.

Acanthodictya hispida Hinde.

Acanthodictya hispida Hinde, Trans. Roy. Soc. Canada, 7, sec. 4, 1890, p. 48, figs. 18, 19, pl. 3, fig. 8.—Rauff, Palaeontographia, 40, 1894, p. 255.—Dawson, Trans. Roy. Soc. Canada, 2d ser., 2, sec. 4, 1896, p. 110, figs. 20, 21, pl. 3, fig. 11.

Canadian? (Levis?): Metis, Quebec.

ACANTHOGRAPTUS Spencer.Genotype: *A. granti* Spencer.

Acanthograptus Spencer, Canadian Nat., n. s. 8, 1878, p. 461.—Lapworth Quart. Jour. Geol. Soc. London, 37, 1881, p. 174.—Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, pp. 562, 581; Bull. Mus. Univ. State Missouri, 1, 1884, p. 31.—Miller, N. A. Geol. Pal., 1889, p. 170.—Ruedemann, Mem. New York State Mus., 9, 1908, p. 191.

ACANTHOGRAPTUS BARTONENSIS Grant. See *Acanthograptus walkeri*.

Acanthograptus chaetophorus Gurley.

Acanthograptus chaetophorus (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1911, p. 61, fig. 84, pl. 3, fig. 5.

Niagaran dolomite: Hamilton, Ontario.

Acanthograptus granti Spencer.

Acanthograptus granti Spencer, Canadian Nat., n. s., 8, 1878, p. 461; 10, 1882, p. 165; Bull. Mus. Univ. State Missouri, 1, 1884, p. 31, pl. 4, fig. 5; Trans. Acad. Sci. St. Louis, 4, 1884, p. 581, pl. 4, fig. 5.—Gurley, Jour. Geol., 4, 1896, pp. 92, 308.—Ruedemann, Mem. New York State Mus., 11 pt. 2, 1908, pl. 6, fig. 3; pl. 7, fig. 3.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 56, 57, figs. 72-74.

Niagaran dolomite: Hamilton, Ontario.

Acanthograptus multispinus Gurley.

Acanthograptus multispinus (Gurley MS.), Bassler, Bull. U. S. Nat. Mus., 65, 1911, p. 61, figs. 85, 86.

Niagaran dolomite: Hamilton, Ontario.

Acanthograptus pulcher Spencer.

Acanthograptus pulcher Spencer, Canadian Nat., 10, 1882, p. 165 (nom. nud.); Bull. Mus. Univ. State Missouri, 1, 1884, p. 32, pl. 4, fig. 6; Trans. Acad. Sci. St. Louis, 4, 1884, pp. 564, 582, pl. 4, fig. 6.—Miller, N. A. Geol. Pal., 1889, p. 170, fig. 128.—Gurley, Jour. Geol., 4, 1896, pp. 92, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 59, 60, figs. 81-83, pl. 4, fig. 5.

Niagaran dolomite: Hamilton, Ontario.

Acanthograptus walkeri (Spencer).

Inocaulis walkeri Spencer, Canadian Nat., 10, 1882, p. 165 (nom. nud.); Bull. Mus. Univ. State Missouri, 1, 1884, p. 35, pl. 5, fig. 2; Trans. Acad. Sci. St. Louis, 4, 1884, p. 585, pl. 5, fig. 2.—Gurley, Jour. Geol., 4, 1896, pp. 99, 309.

Acanthograptus walkeri Ruedemann, Mem. New York State Mus., 11, 1908, p. 194, figs. 97, 98, pl. 6, figs. 1, 2; pl. 7, fig. 4.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 57-59, figs. 75-80.

Acanthograptus bartonensis Grant, Jour. and Proc. Hamilton Assoc., 16, 1900, p. 101 (fig. only).

Acanthograptus walkeri—Continued.

Niagaran dolomite: Hamilton, Ontario.

Clinton (Rochester): Middleport, New York.

Plesiotype.—Cat. No. 54277, U.S.N.M.

ACANTHOLENUS Matthew.

Genotype: *Leptoplastus spiniger* Matthew.

Acantholenus Matthew, Trans. Royal Soc. Canada, 2d ser., 4, sec. 4, 1898, p. 142.

Acantholenus spiniger (Matthew).

Leptoplastus spiniger Matthew, Canadian Rec. Sci., 3, 1889, p. 487, fig. 4.

Anomocare spiniger Matthew, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 61, pl. 13, figs. 4a-e.

Acantholenus spiniger Matthew, Trans. Royal Soc. Canada, 2d ser., 4, sec. 4, 1898, p. 142, pl. 2, figs. 4a-4e; Bull. Nat. Hist. Soc. New Brunswick, 16, 1898, p. 42.

Canadian (Bretonian, Div. C 3b): Long Island, Kennebecasis River, New Brunswick.

ACANTHONEMA Grabau.

Genotype: *A. holopiforme* Grabau.

Acanthonema Grabau, Michigan Geol. Surv., Geol. Ser. 1, 1909, p. 181.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 691.

Acanthonema holopiforme Grabau.

Acanthonema holopiformis Grabau, Michigan Geol. Surv., Geol. Ser. 1, 1909, p. 182, pl. 16, fig. 4, pl. 26, figs. 1-3; pl. 23, figs. 6, 8.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 691.

Upper Monroan: Wayne County, Mich., and Otsego, Wood County, Ohio (Lucas); Detroit River (Amherstburg).

Acanthonema holopiforme obsoletum Grabau.

Acanthonema holopiformis var. *obsoleta* Grabau, Michigan Geol. Surv., Geol. Ser. 1, 1909, p. 183, pl. 26, fig. 1, right half.

Upper Monroan (Lucas): Gibraltar quarry, Wayne County, Michigan.

Acanthonema laxum Grabau.

Acanthonema laxa Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 183, pl. 26, fig. 4; pl. 27, figs. 3, 4.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 691.

Upper Monroan: Grosse Island and Wayne County, Mich. (Lucas); Detroit River (Amherstburg).

Acanthonema newberryi (Meek).

Orthonema newberryi Meek, Proc. Acad. Nat. Sci. Philadelphia, 1871, p. 81; Geol. Surv. Ohio, Pal. 1, 1873, p. 217, pl. 20, figs. 3a-b.—Miller, N. A. Geol. Pal., 1889, p. 414, fig. 690.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 566, fig.

Acanthonema newberryi Grabau, Michigan Geol. Surv., Geol. Ser. 1, 1909, p. 184, pl. 27, fig. 5.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 691, fig. 985.

Upper Monroan (Lucas): Otsego, Wood County, Ohio.

ACASTE Goldfuss. See *Phacopidella* Reed.**ACERVULARIA** Schweigger.

Genotype: *A. baltica* Schweigger—*A. ananas* (Linnaeus).

Acervularia Schweigger, Handb. der Naturg., 1820, p. 418.—Eichwald, Zool. Specialis, pt. 1, Vilnae, 1829, p. 187.—Dana, Wilkes' U. S. Expl. Exped., 1838-42, 7, Zoophytes, 1846, p. 358; Amer. Jour. Sci. and Arts, 2d ser., 1, 1846, p. 184.—Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal., 1851

ACERVULARIA—Continued.

(Arch. Mus. Hist. Nat., 5, 1851), pp. 171, 414.—Pictet, *Traite de Pal.*, 2d ed., 4, 1857, p. 457.—Hall, *Geol. Surv. Iowa*, 1, pt. 2, 1858, p. 476.—Milne-Edwards, *Hist. Nat. d. Corall.*, 3, 1860, p. 407.—Dybowski, *Archiv. f. Natur. Liv.-Ehst. und Kurl.*, 5, 1873, p. 338.—Zittel, *Handbuch Pal.*, 1, 1879, p. 233.—Roemer, *Leth. geog.*, pt. 1, *Leth. Pal.*, 1883, p. 350.—Koch, *Palaeontographica*, 29, 1883, pp. 330, 342.—Miller, *N. A. Geol. Pal.*, 1889, p. 170.—Sherzer, *Amer. Geol.*, 7, 1891, pp. 284–289.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 311, fig. 234.—Lindstrom, *Kongl. Sven. Vet.-Akad. Handl.*, 32, No. 1, 1899, p. 17.—Zittel-Eastman *Textb. Pal.*, 1, 1900, p. 79.—Lambe, *Cont. Can. Pal., Geol. Surv. Canada*, 4, pt. 2, 1901, p. 163.

Acervularia austini (Salter).

Strephodes? Austini Salter, *Sutherland's Jour. Voyage in Baffins Bay, etc.*, 2, 1852, p. ccxxx, pl. 6, figs. 6, 6a.—Etheridge, *Quart. Jour. Geol. Soc. London*, 1878, p. 587.—Woodward, *Geol. Mag.*, dec. 2, 5, 1878, p. 386, pl. 10, figs. 1, 2.
Clisiophyllum austini? Houghton, *Jour. Geo. Soc. Dublin*, 1, 1857, p. 246, pl. 10, figs. 2, 2a.
Acervularia austini Lambe, *The Cruise of the "Neptune," App.* 4, 1906, p. 322; *Cruise of the "Arctic" in 1908–9, 1910*, p. 479.
Niagaran: Cornwallis, Beechey and Griffith's Islands, and Cape Hilgard, Arctic America.

Acervularia clintonensis Nicholson.

Acervularia clintonensis Nicholson, *Geol. Surv. Ohio, Pal.* 2, 1875, p. 227, pl. 23, figs. 2, 2a.—Miller, *N. A. Geol. Pal.*, 1889, p. 170, fig. 129.
 Upper Medinan (Brassfield?): Yellow Springs, Ohio.

ACERVULARIA COMMUNIS Simpson. See *Prismatophyllum inequalis*.

Acervularia gracilis (Billings).

Strombodes gracilis Billings, *Geol. Canada, Geol. Surv. Canada*, 1863, p. 306, fig. 309; *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 113 (*Adv. sheets*, 1862).—Chamberlin, *Geol. Wisconsin*, 1, 1883, p. 190, fig.—Lesley, *Geol. Surv. Pennsylvania, Rep. P.* 4, 1890, p. 1109, fig.
Acervularia gracilis Lambe, *Ottawa Nat.*, 12, 1899, p. 221; *Cont. Can. Pal., Geol. Surv. Canada*, 4, pt. 2, 1901, p. 163, pl. 14, figs. 2, 2a.
 Upper Medinan (Cataract): Manitouaning, Grand Manitoulin Island, Lake Huron.

ACERVULARIA INEQUALIS Schuchert. See *Prismatophyllum inequale*.

ACHRADOCRINUS Schultze.

Genotype: *A. ventrosus* Schultze.

Achradoocrinus Schultze, *Denk. d. Kais. Akad. der Wiss., Math.-Naturw. Cl.* 24, Abth. 2, p. 213, fig. 19.—Zittel, *Handb. Pal.*, 1, 1879, p. 364.—Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1886, pp. 115, 151. (*Rev. Pal.*, pt. 3, sec. 2, pp. 191, 272).—Bather, *Ann. Mag. Nat. Hist.*, 6 ser., 5, 1890, p. 324, pl. 14, fig. 22; *Treatise on Zool.*, pt. 3, *Echinoderma*, 1900, p. 178, fig. 95.—Slocum, *Field Columbian Mus.*, 2, 1908, p. 287.—Zittel, *Handb. Pal.*, 1, 1910, p. 152.

Achradoocrinus patulus Slocum.

Achradoocrinus patulus Slocum, *Field Columbian Mus.*, 2, 1908, p. 288, pl. 85, figs. 1–4.

Niagaran (Racine): Romeo, Illinois.

ACIDASPIS Murchison.Genotype: *A. brightii* Murchison.

Acidaspis Murchison, *Sil. Syst.*, 1839, p. 658.—Hall, *Pal.*, 1 New York, 1847, p. 240.—Barrande, *Neues Jahrb. f. Min., etc.*, 1850, p. 777; *Syst. Sil. du Centre Boheme*, 1, 1852, p. 692.—Salter, *Mem. Geol. Surv. United Kingd.*, dec. 7, 1853, pl. 6.—McCoy, *British Pal. Rocks and Fossils*, 1854, p. 152.—Pictet, *Traite de Pal.*, 2d ed., 2, 1854, p. 517.—Emmons, *Amer. Geology*, 1, pt. 2, 1855, p. 217.—Gehard, *Ninth Rep. New York State Cab. Nat. Hist.*, 1856, p. 46.—Chapman, *Canadian Jour.*, n. s., 1, 1856, p. 282.—Salter, *Cat. Camb. Sil. Foss.*, 1873, p. 134.—Steinhardt, *Beit. z. Naturk. Preus. Phys.-Oekon. Gesell.*, Königsberg, 1874, p. 62.—Miller, *Cincinnati Quart. Jour. Sci.*, 1, 1874, pp. 128, 129.—Angelin, *Pal. Scandinavica*, 3d ed., *Holmiae*, 1878, p. 33.—Walcott, *Science*, 3, 1884, p. 281.—Zittel, *Handb. d. Pal.*, 2, 1885, p. 622.—Schmidt, *Mem. l'Acad. Imp. Sci. St. Petersburg*, 7, ser., 33, 1885, p. 1.—Hall and Clarke, *Pal. New York*, 7, 1888, p. xxxv, fig.; p. xxxvi.—Whidborne, *Mon. Devonian Fauna South England*, 1, *Pal. Soc.*, 1889, p. 11.—Clarke, *10th Rep. State Geol. New York for 1890, 1891*, pp. 63, 67; *44th Rep. New York State Mus.*, 1892, pp. 93, 97.—Vogdes, *Cal. Acad. Sci., Occ. Pap.*, 4, 1893, p. 259.—Beecher, *Amer. Geol.*, 16, 1895, p. 178.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 31, fig. 20.—Oehlert, *Bull. Soc. geol. France*, 3d ser., 24, 1896, p. 112, text fig. 33.—Beecher, *Amer. Jour. Sci.*, 4th ser., 3, 1897, p. 104, pl. 3, fig. 23.—Lindström, *Kongl. Sven. Vet.-Akad. Handl.*, 34, No. 8, 1901, pp. 26, 35.—Miller, *N. A. Geol. Pal.*, 1889, p. 526.—Cumings, *Thirty-second Ann. Rep. Dep. Geol. Nat. Res. Indiana*, 1908, p. 1051.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 311.—Raymond, *Zittel-Eastman Textb. Pal.*, 1913, p. 722.

Observation.—Most of the above references are to *Acidaspis* in a broad sense, including *Ceratocephala* and *Odontopleura*.

ACIDASPIS ANCHORALIS Miller. See *Ceratocephala anchoralis*.

Aeldaspis brevispinosa Foerste.

Acidaspis brevispinosa Foerste, *Geol. Surv.*, Ohio, 7, 1895, p. 522, pl. 37A, fig. 13. Upper Medinan (Brassfield): Huffman Quarry, Dayton, Ohio.

ACIDASPIS CERALEPTA Meek. See *Ceratocephala ceralipta*.

ACIDASPIS CINCINNATIENSIS Meek. See *Ceratocephala cincinnatiensis*.

ACIDASPIS CROSOTUS Cumings. See *Odontopleura crosota*.

ACIDASPIS DANAI Hall. See *Ceratocephala goniata*.

ACIDASPIS FIMBRIATA Hall. See *Ceratocephala fimbriata*.

ACIDASPIS HALLI Shumard. See *Odontopleura halli*.

ACIDASPIS HORANI Billings. See *Ceratocephala horani*.

ACIDASPIS IDA Winchell and Marcy. See *Ceratocephala goniata*.

Aeldaspis obsoleta Van Ingen.

Acidaspis obsoleta Van Ingen, *School of Mines Quart.*, 23, 1901, p. 51, figs. 13, 14, pl., figs. 9, 10.

Niagaran (St. Clair): St. Clair Spring, Independence County, Arkansas.

ACIDASPIS O'NEALLI Miller. See *Odontopleura o'nealli*.

ACIDASPIS ORTONI Foerste. See *Odontopleura ortonii*.

ACIDASPIS PARVULA. See *Odontopleura parvula*.

***Acidaspis perarmata* Whiteaves.**

Acidaspis perarmata Whiteaves, Canadian Rec. Sci., 4, 1891, p. 300, pl. 3, fig. 6; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 289, pl. 42, fig. 3.

Niagaran: Long Point, Lake Winnepigosis, Saskatchewan, Canada.

***Acidaspis quinquespinosa* Lake.**

Acidaspis quinquespinosa Lake, Quart. Jour. Geol. Soc. London, 52, 1896, p. 240, pl. 7, figs. 3, 4.—Van Ingen, School of Mines Quart., 23, 1901, p. 50, fig. 12, pl., figs. 7, 8.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 311, fig. 1621h.

Silurian: Dudley, England (Wenlock); St. Clair Spring, Independence County, Arkansas (Niagaran-St. Clair).

ACIDASPIS RHYNCOCEPHALUS Meek. See *Ceratocephala cincinnatiensis*.

ACIDASPIS SPINIGER Hall. See *Bathyrurus spiniger*.

ACIDASPIS TRENTONENSIS Hall. See *Odontopleura trentonensis*.

***Acidaspis vanhornel* Weller.**

Acidaspis vanhornel Weller, Bull. Chicago Acad. Sci., 4, pt. 2, 1907, p. 251, pl. 23, figs. 3, 4.

Niagaran (Racine): Bridgeport, Illinois.

ACLEISTOCERAS Hyatt. See *Poterioceras* McCoy.

ACROCULIA Phillips. See *Platyceras* Conrad.

***Acrothele* Linnarsson.**

Genotype: *A. coriacea* Linnarsson.

Acrothele Linnarsson, Bihang till K. svensk. Vet.-Akad. Handl., 3, No. 12, 1876, pp. 20-21.—Zittel, Handbuch d. Pal., 1, Abth. 1, 1880, p. 665.—Davidson, British Foss. Brach., 5, pt. 2, 1883, pp. 213-214.—Walcott, Bull. U. S. Geol. Surv., 30, 1886, pp. 107-108.—Ehlert, Man. Conch., 1887, p. 1269.—Hall and Clarke, 11th Ann. Rep. State Geol. New York, 1892, pp. 249, 250; 45th Ann. Rep. New York State Mus., 1892, pp. 565, 566; Pal. New York, 8, pt. 1, 1892, pp. 98-101.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 308.—Mathew, Geol. Surv. Canada, Rep. Can. Rocks Cape Breton, 1903, pp. 103-105.—Grabau and Shimer, N. A. Index Foss., 1, 1907, p. 200.—Walcott, Smiths. Misc. Coll., 53, 1908, pp. 142 and 146; Mon. U. S. Geol. Surv., 51, 1912, p. 630.

***Acrothele levisensis* Walcott.**

Acrothele levisensis Walcott, Smithsonian Misc. Coll., 53, No. 3, 1908, p. 85, pl. 8, fig. 13; Mon. U. S. Geol. Surv., 51, 1912, p. 646, pl. 81, figs. 12, 12a, b.

Canadian (Levis, Didymograptus zone): Point Levis, Quebec.

***Acrothele pretiosa* (Billings).**

Obolella pretiosa Billings, Pal. Foss., 1, 1862, p. 68, fig. 61; Geol. Canada, 1863, p. 230, fig. 239.—Chapman, Canadian Jour., n. s., 8, 1864, p. 191, fig. 160c.; Expos. Min. Geol. Canada, 1864, p. 163, fig. 160b.—Walcott, Bull. U. S. Geol. Surv., 30, 1886, p. 111.

Billingsia pretiosa Ford, Amer. Jour. Sci., 3d ser., 31, 1886, p. 467 (gen. ref.).

Elkania pretiosa Ford, Amer. Jour. Sci., 3d ser., 32, 1886, p. 325 (gen. ref.).

Linnarsonia pretiosa Schuchert (part) Bull. U. S. Geol. Surv., 87, 1897, p. 262.—Walcott, Proc. U. S. Nat. Mus., 23, 1901, p. 673.—Grabau and Shimer, Index Fossils, 1, 1907, p. 200.

Acrothele pretiosa Walcott, Proc. U. S. Nat. Mus., 21, 1898, p. 402; Mon. U. S. Geol. Surv., 51, 1912, p. 652, pl. 58, figs. 1, 1a-g.

Acrothele pretiosa—Continued.

Canadian: Chaudiere River at Grand Trunk Rail Road Bridge, Cape Rouge above Quebec, Canada (Sillery); near Grenville, Washington County, New York; Point Levis, Quebec (Levis, *Didymograptus* zone).

Pteriotype.—Cat. No. 52004 U.S.N.M.

Acrothele rotunda (Nicholson).

Dawsonia rotunda Nicholson, Ann. Mag. Nat. Hist., 4th ser., 11, 1873, p. 141, fig. 3a, b.

Canadian (Levis, *Diplograptus dentatus* zone): Point Levis, Quebec.

ACROTRETA Kutorga.

Genotype: *A. subconica* Kutorga.

Acrotreta Kutorga, Verhandl. Russ.-kais. Min. Gesell. St. Petersburg for 1847, No. 12, 1848, pp. 259, 260.—Morris, Ann. Mag. Nat. Hist., 2d ser., 4, 1849, pp. 316, 318.—Davidson, Brit. Fossil Brach., 1, Introduction, No. 3, 1853, p. 133.—Von Seebach, Zeits. d. d., geol. Gesell., 17, Hft. 2, 1865, p. 341.—Davidson, British Foss Brach., 3, pt. 7, No. 4, 1871, p. 343.—Dall, Bull. U. S. Nat. Mus., 8, 1877, p. 12.—Zittel, Handb. Pal., 1, Abth. 1, 1880, p. 666.—Walcott, Mon. U. S. Geol. Surv., 8, 1884, pp. 16–17.—Ehlert, Man. Conch., 1887, p. 1266.—Hall and Clarke, 11th Ann. Rep. State Geol. New York, 1892, p. 250.—45th Ann. Rep. New York State Mus., 1892, p. 566; Pal. New York, 8, pt. 1, 1892, pp. 101–104.—Schuchert, Zittel-Eastman, Textb. Pal., 1, 1900, p. 308.—Matthew, Bull. Nat. Hist. Soc. New Brunswick, 4, pt. 5, 1902, p. 390; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 94–97.—Grabau and Shimer, N. A. Index Foss., 1, 1907, p. 199.—Walcott, Smithsonian Misc. Coll., 53, 1908, pp. 142, 146; Mon. U. S. Geol. Surv., 51, 1912, p. 671.

Linnarssonsonia Walcott, Amer. Jour. Sci., 3d ser., 29, 1885, p. 115.—Matthew, Trans. Royal Soc. Canada, 1st ser., 3, sec. 4, 1886, p. 35.—Dawson, Trans. Royal Soc. Canada, 1st ser., 7, sec. 4, 1890, pp. 53–54.—Hall and Clarke, 11th Ann. Rep. State Geol. New York, 1892, p. 251; 45th Ann. Rep. New York State Mus., 1892, p. 567; Pal. New York, 8, pt. 1, 1892, pp. 107–109.—Matthew, Trans. Royal Soc. Canada, 1st ser., 9, sec. 4, 1892, p. 42.

ACROTRETA ATTENUATA Meek (part). See *Acrotreta idahoensis*.

ACROTRETA BAILEYI Matthew. See *Acrotreta bisecta*.

Acrotreta belti (Davidson?) (Matthew).

?*Obolella belti* Davidson, Geol. Mag., 5, 1868, p. 310, pl. 15, figs. 25–27.

Linnarssonsonia belti? Matthew, Trans. Royal Soc. Canada, 1st ser., 9, sec. 4, 1892, pp. 42, 43, pl. 12, figs. 7a–c; Geol. Surv. Canada, Rep. Cambrian rocks Cape Breton, 1903, p. 209, pl. 16, fig. 3a–c.

Lower Tremadoc shales: North Wales.

Canadian (Bretonian—Div. C. 3 c): St. John, New Brunswick.

Acrotreta bisecta Matthew.

Acrotreta baileyi Matthew, Trans. Royal Soc. Canada, 1st ser., 9, sec. 4, 1892, p. 43, pl. 12, fig. 7d.

Acrotreta bisecta Matthew, Bull. Nat. Hist. Soc. New Brunswick, 4, pt. 4, 1901, pp. 275–276, pl. 5, figs. 5a–g; *ibid.*, pt. 5, 1902, p. 394, pl. 16, figs. 2a–g.—Walcott, Proc. U. S. Nat. Mus., 25, 1902, p. 582.—Matthew, Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, pp. 186–187, pl. 11, figs. 5a–g.—Walcott, Proc. U. S. Nat. Mus., 28, 1905, pp. 298–299; Mon. U. S. Geol. Surv., 51, 1912, p. 678, pl. 66, figs. 7, 7a–e.

Acrotreta bisecta—Continued.

Acrotreta sipo Matthew, Bull. Nat. Hist. Soc. New Brunswick, 4, pt. 5, 1902, pp. 406–407, pl. 18, figs. 1, 2; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, pp. 185–186, pl. 18, figs. 1, 2.

Canadian (Bretonian—Div. C. 3 c): McLeod Brook, Cape Breton, Nova Scotia, and Navy Island, St. John Harbor, New Brunswick.

Acrotreta? cancellata Walcott.

Acrotreta? cancellata Walcott, Proc. U. S. Nat. Mus., 28, 1905, p. 299; Mon. U. S. Geol. Surv., 51, 1912, p. 679, pl. 79, figs. 5, 5a.

Canadian (Lower Pogonip): Roundtop Mountain, Eureka County, Nevada.

Acrotreta convexa Walcott.

Acrotreta convexa Walcott, Proc. U. S. Nat. Mus., 25, 1902, p. 584; Mon. U. S. Geol. Surv., 51, p. 682, pl. 66, figs. 6, 6a–c.

Canadian (Bretonian—Div. C. 3 c): Salmon River, thirteen miles south of Marion Bridge, etc., Cape Breton, Nova Scotia.

Acrotreta curvata Walcott.

Acrotreta gemma Walcott (not Billings) (part), Mon. U. S. Geol. Surv., 8, 1884, pp. 17, 18, pl. 1, figs. 1d, 1e (not figs. 1a–c, f); 10th Ann. Rep. U. S. Geol. Surv., 1891, p. 608, pl. 67, fig. 5b (not figs. 5a–e).—Hall and Clarke (part), Pal. New York, 8, pt. 1, 1892, p. 102, fig. 55 (not figs. 56, 57).—Walcott (part), Mon. U. S. Geol. Surv., 32, pt. 2, 1899, p. 499, pl. 62, fig. 2e (not figs. 2, 2a–d).

Acrotreta curvata Walcott, Proc. U. S. Nat. Mus., 25, 1902, p. 584; Mon. U. S. Geol. Surv., 51, 1912, p. 682, pl. 68, figs. 1a–n.

Canadian (Lower Pogonip): Hamburg Ridge, Eureka District, Eureka County, Nevada. Also in Upper Cambrian of Oklahoma.

Holotype and *paratypes*.—Cat. No. 35269, U.S.N.M.

Acrotreta gemma Billings.

Acrotreta gemma Billings, Geol. Surv. Canada, Pal. Fossils, 1, 1865, pp. 216, 217, figs. 201a–f.—Walcott, Mon. U. S. Geol. Surv., 51, 1912, p. 685, pl. 66, figs. 1a–b.

Canadian (Quebec—P.): Four miles northeast of Portland Creek, Newfoundland.

ACROTRETA GEMMA Walcott. See *Acrotreta curvata* and *A. idahoensis alta*.

Acrotreta idahoensis Walcott.

Acrotreta attenuata Meek (part), 6th Ann. Rep. U. S. Geol. and Geog. Surv. Terr. for 1872, 1873, p. 463, footnote.

Acrotreta idahoensis Walcott, Proc. U. S. Nat. Mus., 25, 1902, p. 587; Mon. U. S. Geol. Surv., 51, 1912, p. 687, pl. 65, figs. 1a–i; pl. 68, figs. 2a–g.

Canadian (Lower Pogonip): East of Hamburg Ridge, etc., Eureka County, Nevada. Also Upper and Middle Cambrian of Utah, Montana, etc.

Holotype and *paratypes*.—Cat. Nos. 52089, 52091, U.S.N.M.

Acrotreta idahoensis alta Walcott.

Acrotreta gemma Walcott (not Billings) (part), Mon. U. S. Geol. Surv., 8, 1884, pp. 17, 18, pl. 1, figs. 1a, 1b (not figs. 1c–f); pl. 9, figs. 9, 9a; 10th Ann. Rept. U. S. Geol. Surv., 1891, p. 608, pl. 67, figs. 5, 5a (not figs. 5b–e).—Hall and Clarke (part) Pal., New York, 8, pt. 1, 1892, p. 102, figs. 56, 57 (not fig. 55).—Walcott, (part), Mon. U. S. Geol. Surv., 32, pt. 2, 1899, p. 499, pl. 62, figs. 2a, 2c (not figs. 2, 2b, 2d, 2e).

Acrotreta idahoensis alta Walcott, Proc. U. S. Nat. Mus., 25, 1902, p. 588; Mon. U. S. Geol. Surv., 51, 1912, p. 689, pl. 65, figs. 4–4b.

Acrotreta idahoensis alta—Continued.

Canadian (Base of Pogonip): Adams Hill, Eureka County, Nevada. Also Middle and Upper Cambrian of Montana, Utah, and Nevada.

Holotype and *paratype*.—Cat. Nos. 35273, 52099 U.S.N.M.

ACROTRETA MINUTA Walcott. See *Linnarssonella minuta*.

Acrotreta ovalis Walcott.

Acrotreta ovalis Walcott, Proc. U. S. Nat. Mus., 25, 1902, p. 592; Mon. U. S. Geol. Surv., 51, 1912, p. 699, pl. 66, figs. 2, 2a-b.

Ozarkian? (Levis-erratic): Point Levis, Quebec.

ACROTRETA SIPO Matthew. See *Acrotreta bisecta*.

ACTINOCERAS Bronn.

Genotype: *A. bigsbyi* Bronn.

Actinoceras Bronn, Leth. geog., 1837, p. 97.—Stokes, Proc. Geol. Soc. London, 2, 1838, p. 689; Trans. Geol. Soc. London, 2d ser., 5, 1840, p. 707.—McCoy, Syn. Char. Carb. Foss. Ireland, 1844, p. 11.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 3.—Woodward, Man. Mollusca, pt. 1, 1851, p. 88, fig. 47.—Saemann, Palaeontographica, 3, 1852, pp. 137, 145, 156.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 638.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 148.—Barrande, Bull. Soc. Geol. France, 2d ser., 12, pt. 1, 1855, p. 458; Neues Jahrb. f. Min., etc., 1855, p. 395.—Woodward, Geol. Mag., 5, 1868, p. 133.—Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1879, p. 760.—Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1883, p. 272.—Zittel, Handb. Pal., 2, 1884, p. 368.—Foord, Geol. Mag., dec. 3, 5, 1888, p. 487; Cat. Foss. Ceph. Brit. Mus., 1, 1888, p. 164.—Miller, N. A. Geol. Pal., 1889, p. 431.—Whidborne, Mon. Dev. Fauna South England, 1, Pal. Soc., 1890, p. 119.—Bather, Nat. Sci., 5, 1894, pp. 431, 434, fig. 6.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 781.—Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 528.—Foord, Mon. Carb. Ceph. Ireland, pt. 5, Pal., Soc., App., 1903, p. 211.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 114.—Hyatt, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 609.

Ormoceras. Stokes, Proc. Geol. Soc. London, 2, 1838, p. 689; Trans. Geol. Soc. London, 2d ser., 5, 1840, p. 709.—Woodward, Man. Mollusca, pt. 1, 1851, p. 88, fig. 48.—Saemann, Palaeontographica, 3, 1852, pp. 146, 156.—Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, pp. 326, 328.—Barrande, Neues Jahrb. f. Min., etc., 1855, p. 400.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 150.—Barrande, Bull. Soc. Geol. France, 2d ser., 12, pt. 1, 1855, p. 470.—Chapman, Canadian Jour., n. s., 8, 1863, p. 20; Expos. Min. Geol. Canada, 1864, p. 128.—Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 765.—Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 271.—Zittel, Handb. Pal., 2, 1884, p. 368.—Miller, N. A. Geol. & Pal., 1889, p. 445.—(Genotype: *O. bayfieldi* Stokes).

Paractinoceras (subgenus of *Actinoceras*) Hyatt, Zittel-Eastman Textb. Pal., 1900, p. 528 (Genotype: *Sactoceras canadense* Whiteaves).

Deiroceras (subgenus of *Actinoceras*) Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 273 (Genotype: *Orthoceras python* Billings).

Conotubularia Troost, Mem. Soc. Geol. France, 3, 1838, p. 87; 5th Geol. Rep. Tennessee, 1840, p. 5.—Saemann, Palaeontographica, 3, 1852, p. 146.—Barrande, Syst. Sil. Boheme, 2, pt. 3, 1874, p. 767. (Genotype: *C. cuvierii* Troost.)

Actinoceras abnorme (Hall).

Orthoceras abnorme Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 355, pl. 18 (9), fig. 10; rev. ed. 1868 (1870), p. 415, pl. 18, fig. 10; pl. 25, fig. 18.—Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 756, pl. 456.—Day, Trans. Wisconsin Acad. Sci., Arts Letters, 4, 1879, p. 120.

Actinoceras abnorme—Continued.

Orthoceras (*Actinoceras*) *abnorme* Zittel, Handb. Pal., 2, 1884, p. 367, fig. 506.

Actinoceras abnorme Ruedemann, Bull. New York State Mus., 80, 1905, p. 332, fig. 22.

Niagaran (*Racine* and *Guelph*): *Racine*, etc., Wisconsin.

ACTINOCERAS ALLUMETTENSE Whiteaves. See *Loxoceras allumettense*.

Actinoceras anticostiense (Billings).

Orthoceras Anticostiense, Billings, Geol. Surv. Canada, Rep. Progr. for 1853–56, 1857, p. 316; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 22 (loc. ref.).—Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 731, pl. 434.

Richmond and Gamachian: Charleton Point, etc., Anticosti.

Actinoceras backi (Stokes).

Orthoceras — Bigsby, Trans. Geol. Soc. London, 1, pt. 2, 1824, p. 204, pl. 30, fig. 1.

Orthoceras Backii Stokes, Proc. Geol. Soc. London, 2, 1838, p. 689.

Orthoceras nummularium Etheridge (not Sowerby), Quart. Jour. Geol. Soc. London, 34, 1878, p. 608.

Actinoceras Backi Foord, Cat. Foss. Ceph. British Mus., 1, 1883, p. 182.

Niagaran: Drummond Island, Lake Huron; Cape Louis Napoleon, Smith Sound, and Bessels Bay, Kennedy Channel, Arctic America.

Observation.—See *Actinoceras rotulatum* (Billings) for a possible synonym.

Actinoceras bayfieldi (Stokes).

Ormoceras Bayfieldii Stokes, Proc. Geol. Soc. London, 2, 1838, p. 689 (nom. nud.); Trans. Geol. Soc. London, 2d ser., 5, 1840, p. 709, pl. 40, fig. 1.—Woodward,

Man. Mollusca, pt. 1, 1851, p. 88, footnote, fig. 48.—Barrande, Bull. Soc. Geol. France, 2d ser., 12, 1855, p. 470, pl. A, fig. 5; Neues Jahrb. f. Min., etc.,

1855, p. 408, pl. 6, fig. 5.—Miller, N. A. Geol. Pal., 1889, p. 445, fig. 749.

Orthoceras Bayfieldi Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 738, pl. 231.

Orthoceras (*Ormoceras*) *Bayfieldi*, Zittel, Handb. Pal., 2, 1884, p. 368, fig. 507.

Niagaran: Drummond Island, Lake Huron.

Actinoceras beaumonti Castelnau.

Actinoceras Beaumonti Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 32, pl. 6, fig. 1.

Niagaran: Drummond Island, Lake Huron.

Actinoceras beloitense (Whitfield).

Orthoceras (*Actinoceras*) *Beloitense* Whitfield, Ann. Rep. Geol. Surv. Wisconsin, for 1877, 1878, p. 77; Geol. Wisconsin, 4, 1882, p. 226, pl. 8, fig. 1; pl. 10, figs. 9, 10.

Orthoceras Beloitense Chamberlin, Geol. Wisconsin, 1883, p. 159, figs.

Actinoceras beloitense Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 782, pl. 47, fig. 18.—Holtedahl, Vidensk. Skrifter, 1, No. 9, 1912, p. 8, pl. 4, fig. 2.

Orthoceras — Bigsby, Trans. Geol. Soc. London, 1, pt. 2, 1824, p. 198, pl. 25, fig. 3 (not 1, 2).

Actinoceras Bigsbyi, Stokes (part) Trans. Geol. Soc. London, 2d ser., 5, pt. 3, 1840, p. 707.

Orthoceras (*Ormoceras*) *Backii*? Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 298, pl. 1, fig. 4.—Barrande, Syst. Sil. Centre Boheme, 2, text 4, 1877, p. 264, pl. 474, fig. 11.

Black River (*Platteville*): Beloit and Janesville, Wisconsin; Thessalon Island, Lake Huron; Arctic America.

Actinoceras beudanti Castelnau.

Actinoceras Beudanti Castelnau, *Essai Syst. Sil. l'Amerique Septent.*, 1843, p. 34, pl. 6, fig. 2.

Niagaran: Drummond Island, Lake Huron.

Actinoceras bigsbyi Bronn.

Orthoceras — *Bigsby*, *Trans. Geol. Soc. London*, 1, 1824, p. 198, pl. 25, figs. 1, 2 (not 3).

Actinoceras Bigsbyi Bronn, *Leth. Geog.*, 1, 1837, p. 98, pl. 1, fig. 8.—*Stokes*, *Trans. Geol. Soc. London*, 2d ser., 5, 1840, p. 707.—*Seamann*, *Palæontographica*, 3, 1852, p. 142.—*Foord*, *Cat. Ceph. British Mus.*, 1, 1888, p. 168.—*Whiteaves*, *Trans. Royal Soc. Canada*, 9, sec. 4, 1892, p. 84, pl. 10, fig. 2; *Pal. Foss.*, *Geol. Surv. Canada*, 3, pt. 3, 1897, p. 208.—*Clarke*, *Geol. Minnesota*, 3, pt. 2, 1897, p. 781, pl. 47, figs. 15-17.—*Grabau and Shimer*, *N. A. Index Fossils*, 2, 1910, p. 115, fig. 1350.

Orthoceras bigsbyi Billings, *Geol. Canada*, *Geol. Surv. Canada*, 1863, p. 149, fig. 109a, b, and App., p. 949.—*Lesley*, *Geol. Surv. Pennsylvania*, Rep. P 4, 1889, p. 543, figs.

Orthoceras (Actinoceras) Bigsbyi Barrande, *Neues Jahrb. f. Min.*, etc., 1855, p. 400, *Syst. Sil. du Centre Boheme*, 1, pt. 3, 1874, p. 734, pl. 231, figs. 4, 5; pl. 437, figs. 10-16.—*Roemer*, *Leth. geog.*, 1, *Leth. Pal.*, 1876, pl. 16, fig. 7.

Actinoceras Lyonii Stokes, *Trans. Geol. Soc. London*, 2d ser., 5, pt. 3, 1840, p. 707, pl. 59, fig. 1.—*Castelnau*, *Syst. Sil. de l'Amerique Septent.*, 1843, p. 32, pl. 17, figs. 1a-b.

Ormoceras Lyonii Hector, *Quart. Jour. Geol. Soc. London*, 17, 1861, p. 439.

Conoceras angulosum Saemann, *Palæontographica*, 3, 1852, p. 144.

Black River: Thessalon Island, Lake Huron; New York; Ontario; Manitoba; Kentucky; Tennessee; Minnesota; Arctic America, etc.

ACTINOCERAS BIGSBYI Stokes (part). See *Actinoceras beloitense*.

Actinoceras blainvillei Castelnau.

Actinoceras Blainvillei Castelnau, *Essai Syst. Sil. l'Amerique Septent.*, 1843, p. 31, pl. 5, fig. 1; pl. 8, fig. 1.

Niagaran: Little Manitoulin Island, Lake Huron.

Actinoceras (Paractinoceras) canadense (Whiteaves).

Sactoceras Canadense Whiteaves, *Trans. Royal Soc. Canada*, 9, sec. 4, 1892, p. 85, pl. 10, figs. 1a-c.

Orthoceras Canadense Miller, *N. A. Geol. Pal.*, 1st App., 1892, p. 697.

Actinoceras (Sactoceras?) Canadense Whiteaves, *Pal. Foss.*, *Geol. Surv. Canada*, 3, pt. 3, 1897, p. 210.

Paractinoceras Canadense Hyatt, *Zittel-Eastman Textbook Pal.*, 1900, p. 528.—*Whiteaves*, *Geol. Surv. Canada*, *Pal. Foss.*, 3, pt. 4, 1906, p. 344.

Black River or Richmond: Lake Winnipeg, Manitoba.

ACTINOCERAS CAPITOLINUM Foord. See *Actinoceras cuvieri*.

Actinoceras clouei (Barrande).

Orthoceras clouei Barrande, *Syst. Sil. du Centre Boheme*, ser. 2, 1870, pl. 432, figs. 1-6; pl. 433, figs. 1, 2; pl. 434, figs. 1-5.

Ordovician: Newfoundland.

Actinoceras cordieri Castelnau.

Actinoceras Cordieri Castelnau, *Essai Syst. Sil. l'Amerique Septent.*, 1883, p. 31, pl. 5, fig. 2.

Niagaran: Great Manitoulin Island, Lake Huron.

Actinoceras crebrisepalum (Hall).

Ormoceras crebrisepalum Hall, Pal. New York, 1, 1847, p. 313, pl. 86, fig. 2a; pl. 87, figs. 2a-e.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 151.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 821, fig. 621.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 504, fig.

Actinoceras crebrisepalum D'Orbigny, Prodr. Pal., 1, 1849, p. 3 (gen. ref.).—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 173.

Orthoceras crebrisepalum Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 218, fig. 228.—Chapman, Canadian Jour. n. s., 8, 1863, p. 206, fig. 208; Expos. Min. Geol. Canada, 1864, p. 178, fig. 208.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 546, figs.

Orthoceras (Ormoceras) crebrisepalum Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 739, pl. 434, figs. 6-8.

Cincinnati (Pulaski): Turin, Pulaski, etc., New York.

Actinoceras(?) cuvieri (Troost).

Conotubularia Cuvierii Troost, Mem. Soc. Geol. France, 3, 1838, p. 88, pl. 9, fig. 1; 5th Geol. Rep. Tennessee, 1840, p. 48; 6th Geol. Rep. Tennessee, 1841, p. 176.

Actinoceras Cuvieri D'Orbigny, Prodr. Pal., 1, 1849, p. 3 (gen. ref.).

Orthoceras cuvieri Miller, N. A. Geol. Pal., 1889, p. 447 (gen. ref.).

Orthoceras capitolum Safford, Geol. Tennessee, 1869, p. 290, pl. 4 (G. 3), figs. 1a, b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 544, figs.

Actinoceras capitolum Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 174.

Jovellania capitolum Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 327 (gen. ref.).

Trenton (Bigby): Nashville, Tennessee.

Actinoceras daytonense (Foerste).

Orthoceras (Actinoceras) Daytonensis Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 286, pl. 8, fig. 6; Geol. Surv. Ohio, 7, 1893, p. 539, pl. 33, fig. 6.

Upper Medinan (Brassfield): Soldiers' Home, near Dayton, Ohio.

Actinoceras deshayesi Castelnau.

Actinoceras Deshayesi Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 32, pl. 8, fig. 4.

Silurian: Green Bay, Lake Michigan.

Actinoceras distans (Hall).

Endoceras distans Hall, Pal. New York, 1, 1847, p. 220, pl. 58, figs. 1a, b.

Actinoceras distans Whitfield and Hovey, Bull. Amer. Mus. Nat. Hist., 11, pt. 1, 1898, p. 58 (gen. ref.).

Trenton: Turin, Lewis County, New York.

Actinoceras dufresnoyi Castelnau.

Actinoceras Dufresnoyi Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 32, pl. 8, fig. 3.

Niagaran: Drummond Island, Lake Huron.

Actinoceras fulgur (Billings).

Orthoceras propinquum Billings (not Eichwald), Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 320.

Orthoceras fulgur Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 22.

Richmond (Charleton): Charleton Point, Anticosti.

Actinoceras gracile (Hall).

Ormoceras? *gracile* Hall, Pal. New York, 1, 1847, p. 58, pl. 17, fig. 3.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 151.—Leesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 504, fig.

Actinoceras gracile D'Orbigny, Prodr. Pal., 1, 1849, p. 3 (gen. ref.).

Hormoceras? *gracile* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 601 (gen. ref.).

Black River (Watertown): Watertown, New York.

Actinoceras hearsti Parks.

Actinoceras hearsti Parks, in Tyrrell, 22d Rep. Ontario Bur. Mines, 1913, p. 37. Niagaran (Guelph): Severn River, Ontario.

Actinoceras infelix (Billings).

Orthoceras infelix Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 57.

Actinoceras (*Orthoceras*) *infelix* Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1883, p. 272.

Anticostian (Becarie River—Jupiter River): Southwest Point, Anticosti.

Actinoceras keewatinense Whiteaves.

Actinoceras Keewatinense Whiteaves, Ann. Rep. Geol. Surv. Canada (n. s.), 14, App. F, 1904, p. 54; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, pp. 246, 263, pl. 30, figs. 7, 8.

Niagaran: Rainy Island, Attawapiskat River and Ekwan River, Canada.

Actinoceras latonummulatum (Foerste).

Orthoceras (*Actinoceras*) *latonummulatus* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 285, pl. 8, fig. 4; Geol. Surv. Ohio, Pal. 7, 1893, p. 538, pl. 33, fig. 4.

Upper Medinan (Brassfield): Soldiers' Home, near Dayton, Ohio.

ACTINOCERAS LYONI Stokes. See *Actinoceras bigsbyi*.

ACTINOCERAS LYONI Whiteaves. See *Actinoceras richardsoni*.

Actinoceras (Deiroceras) python (Billings).

Orthoceras python Billings, Geol. Surv. Canada, Rep. Progr. for 1853–56, 1857, p. 335.

Deiroceras python Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1883, p. 273 (gen. ref.).

Actinoceras (*Deiroceras*) *python* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 210.

Trenton: Ottawa, Montreal and Lake Winnipeg, Canada.

Actinoceras remotiseptum (Hall).

Ormoceras remotiseptum Hall, 3d Rep. New York State Cab. Nat. Hist., rev. ed., 1850, p. 181, pl. 4, fig. 3. (Doc. ed., p. 173).

Actinoceras remotiseptum Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 782, pl. 54, figs. 1–3.—Foord, Cat. Foss. Ceph. Brit. Mus., 1, 1888, p. 172.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 115.

Hormoceras remotiseptum Clarke and Ruedemann, New York State Mus., Bull. 65, p. 602 (gen. ref.).

Black River: Watertown, New York (Watertown); Cannon Falls, Minnesota (Platteville).

Actinoceras richardsoni Stokes.

Actinoceras Richardsonii Stokes, Proc. Geol. Soc. London, 2, p. 689 (nom. nud.); Trans. Geol. Soc. London, 2d ser., 5, 1840, p. 708, pl. 59, figs. 2, 3.—Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 30, pl. 7, figs. 1, 2; pl. 8, figs.

Actinoceras richardsoni—Continued.

- 2a, b.—Woodward, Man. Mollusca, pt. 2, 1851, p. 88, footnote, fig. 47.—Barrande, Neues Jahrb. f. Min., etc., 1855, p. 396, pl. 6, figs. 6, 7; Bull. Soc. Geol. France, 2d ser., 12, 1855, p. 461, pl. B, figs. 6, 7.—Foord, Cat. Foss. Ceph. Brit. Mus., pt. 1, 1888, p. 172.—Miller, N. A. Geol. Pal., 1889, p. 431, text fig. 725.—Whiteaves, Trans. Royal Soc. Canada, 9, sec. 4, p. 83, pl. 9, figs. 1, 2, 2a, 3, 4a; Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 207.
- Orthoceras richardsoni* Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 737, pl. 234.
- ?*Ormoceras Brongniarti* Owen, Geol. Rep. Wisconsin, Iowa, Minnesota, 1852, p. 181.
- Actinoceras Lyoni* Whiteaves (not Stokes), Geol. Surv. Canada, Rep. Progr. 1878-79, 1880, pp. 460, and 48c of Appendix 1.
- Black River or Richmond: Lake Winnipeg, Canada.

Actinoceras richardsoni magnum Parks.

- Actinoceras richardsoni* var. *magnum* Parks in Tyrrell, 22nd Rep. Ontario Bur. Mines, 1913, p. 33.
- Mohawkian or Richmond: Shamattawa River, Manitoba.

Actinoceras rotulatum (Billings).

- Orthoceras rotulatum* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 334.—Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 732, pl. 437, figs. 1-5.
- Niagaran: Head of Lake Temiscaming, Canada.
- Observation.—Considered synonymous with *A. backi* (Stokes) by Foord (Cat. Foss. Ceph. British Mus., 1, 1888, p. 182).

Actinoceras sedgwicki (Billings).

- Orthoceras Sedgwicki* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 320; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, pp. 22, 58 (loc. ref.).
- Richmond and Gamachian: West End, Gamachi Bay, etc., Anticosti.

Actinoceras sphæroidale (Stokes).

- Huronias sphæroidalis* Stokes, Trans. Geol. Soc. London, 2d ser., 1, pt. 2, 1824, p. 203, pl. 28, fig. 5.
- Orthoceras (Huronias) sphæroidale* Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 742, pl. 232, fig. 3.
- Actinoceras sphæroidale* Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 186.
- Niagaran: Drummond Island, Lake Huron.

Actinoceras tenuifilum (Hall).

- Ormoceras tenuifilum* Hall, Pal. New York, 1, 1847, p. 222, pl. 58, figs. 2a-c; p. 55, pl. 15, figs. 1a-c; pl. 16, figs. 1a-e; pl. 17, figs. 1a, b.—Saemann, Paleontographica, 3, 1852, p. 142.—Barrande, Neues Jahrb. f. Min., etc., 1855, p. 398, 405.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 72.—Chapman, Canadian Jour., n. s., 8, 1863, p. 20, fig. 129, p. 198, fig. 171; Expos. Min. Geol. Canada, 1864, p. 128, fig. 129, p. 170, fig. 171.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 158, fig.—Lesley, Geol. Surv. Pennsylvania Rep. P. 4, 1889, p. 504, fig.
- Hormoceras tenuifilum* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 602 (gen. ref.)
- Actinoceras tenuifilum* D'Orbigny, Prod. Pal., 1, 1849, p. 3 (gen. ref.).—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 151.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 115, fig. 1351.

Actinoceras tenuifilum—Continued.

Orthoceras (*Ormoceras*) *tenuifilum* Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 754, pl. 237.

Orthoceras tenuifilum James, Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 241.

Black River: Watertown, Lowville, etc., New York (Watertown); Kentucky; Tennessee.

Actinoceras tenuifilum distans (Hall).

Ormoceras tenuifilum? var. *distans* Hall, Pal. New York, 1, 1847, p. 58, pl. 17, fig. 2.

Black River (Watertown): Watertown, etc., New York.

Actinoceras turgidonummulatum (Foerste).

Orthoceras (*Actinoceras*) *turgido-nummulatus* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 285, pl. 8, fig. 7; Geol. Surv. Ohio, Pal. 7, 1893, p. 538, pl. 33, fig. 7; pl. 35, figs. 1, 2.

Upper Medinan (Brassfield): Soldiers Home, near Dayton, Ohio

Actinoceras vertebratum (Hall).

Ormoceras vertebratum Hall, Pal. New York, 2, 1852, p. 94, pl. 29, fig. 1a-g.—Lesley, Geol. Surv. Pennsylvania Rep., P 4, 1889, p. 504, figs.

Orthoceras (*Ormoceras*) *vertebratum* Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 755, pl. 232, 237.

Actinoceras vertebratum Foord, Cat. Foss. Ceph. Brit. Mus., 1, 1888, p. 185.—

Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 528, fig. 1078.

Lower Clinton: Reynale's Basin, New York.

Actinoceras whitei (Stokes).

Orthoceras ——— Bigsby, Trans. Geol. Soc. London, 1, pt. 2, 1824, p. 204, pl. 30, fig. 2.

Ormoceras whitei Stokes, Proc. Geol. Soc. London, 2, 1838, p. 689; Trans. Geol. Soc. London, 2d ser., 5, 1840, p. 709.

Actinoceras whitei Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 184.

Orthoceras Backi Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 731, pl. 437, figs. 17, 18.

Niagaran: Drummond Island, Lake Huron.

Actinoceras youngi (Foerste).

Orthoceras (*Actinoceras*) *youngi* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 284, pl. 8, fig. 3; Geol. Surv. Ohio, Pal., 7, 1893, p. 537, pl. 33, fig. 3; pl. 36, fig. 1.

Upper Medinan (Brassfield): Hanover, Indiana; Dayton, Ohio.

ACTINOCRINITES TENNESSEÆ Troost. See *Periechocrinus tennesseensis* and *P. dubius*.

ACTINOCRINITES VERNEULI Troost. See *Melocrinus roemeri*.

ACTINOCRINUS CHRISTYI Hall. See *Periechocrinus whitfieldi*.

ACTINOCRINUS MEEKI Lyon. See *Macrostylocrinus meeki*.

ACTINOCRINUS OBYPYRAMIDALIS Winchell and Marcy. See *Melocrinus obpyramidalis*.

ACTINOCRINUS? PLUMOSUS Hall. See *Glyptocrinus plumosus*.

ACTINOCRINUS POLYDACTYLUS Bonny. See *Melocrinus pachydactylus*.

ACTINOCRINUS (SACCOCRINUS) SEMIRADIATUS Hall. See *Macrostylocrinus semiradiatus*.

ACTINOCRINUS SPECIOSUS Meek and Worthen. See *Periechocrinus speciosus*.

ACTINOCRINUS SUBCRASSUS Meek and Worthen. See *Iocrinus subcrassus*.

ACTINOCRINUS TENUIRADIATUS Hall. See *Palaecystites tenuiradiatus*.

ACTINOCRINUS WALDRONENSIS Shumard. See *Periechocrinus whitfieldi*.

ACTINOCRINUS WHITFIELDI Shumard. See *Periechocrinus whitfieldi*.

ACTINODICTYON Parks.

Genotype: *A. canadense* Parks.

Actinodictyon Parks, Univ. Toronto Studies, Geol. Ser., No. 6, 1909, p. 30.

Actinodictyon canadense Parks.

Actinodictyon canadense Parks, Univ. Toronto Studies, Geol. Ser. No. 6, 1909, p. 32, pl. 20, figs. 1, 2.

Niagaran: Southampton Island, Hudson Bay, Canada.

Actinodictyon keelei Parks.

Actinodictyon keelei Parks, Univ. Toronto Studies, Geol. Ser. No. 5, 1909, p. 35, pl. 19, figs. 5, 6.

Niagaran: Gravel River, Mackenzie District, Canada.

Actinodictyon lowi Parks.

Actinodictyon lowi Parks, Univ. Toronto Studies, Geol. Ser. No. 6, 1909, p. 33, pl. 20, figs. 3, 4.

Niagaran: Southampton Island, Hudson Bay, Canada.

Actinodictyon neptuni Parks.

Actinodictyon neptuni Parks, Univ. Toronto Studies, Geol. Ser. No. 6, 1909, p. 34, pl. 20, figs. 5, 6.

Niagaran: Southampton Island, Hudson Bay, Canada.

ACTINODONTA Phillips. See *Lyrodesma* Conrad.

ACTINOMYA Ulrich. See *Whiteavesia* Ulrich.

ACTINOPTERIA Hall.

Genotype: *A. decussata* Hall.

Actinopteria Hall, Pal. New York, 5, pt. 1, Lam. (adv. copy), 1883, p. 3; *ibid.*, 1884, p. xii; 35th Rep. New York State Mus. Nat. Hist., 1884, p. 406b; 1st Rep. State Geol. New York, 1884, p. 13.—Miller, N. A. Geol. Pal., 1889, p. 459.—Nettelroth, Kentucky, Foss. Shells, Geol. Surv. Kentucky, 1889, p. 229.—Jackson, Mem. Boston Soc. Nat. Hist., 4, 1890, p. 386.—Whidborne, Mon. Dev. Fauna South England, 2, Pal. Soc., 1892, p. 59.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 245.—Clarke, Archiv. Mus. Nac. de Janeiro, 10, author's Eng. ed., 1900, p. 45.—Hind, Mon. British Carb. Lamell., 2, Pal. Soc., 1901, p. 22.

Actinopteria bella Williams.

Actinopteria bella Williams, Proc. U. S. Nat. Mus., 45, 1913, p. 342, pl. 30, figs. 17, 19.

Silurian (Pembroke): Leighton Cove, Washington County, Maine.

Cotypes.—Cat. No. 58964, U.S.N.M.

Actinopteria communis (Hall).

Avicula communis Hall, Pal. New York, 3, 1859, p. 286, pl. 3, figs. 1-7; pl. 53, figs. 1, 4, 6.

Actinopteria communis Clarke, Mem. New York State Mus., 3, No. 3, 1900, p. 34, pl. 4, figs. 1, 2.—Weller, Pal. New Jersey, 3, 1903, p. 292, pl. 31, fig. 21.—Ohern, Maryland Geol. Surv., Low. Dev., 1913, p. 455, pl. 76, figs. 2-4.

Helderbergian: Helderberg Mountains, etc., New York; New Jersey; Cumberland, Maryland (Keyser, etc.).

Actinopteria dispar Williams.

Actinopteria dispar Williams, Proc. U. S. Nat. Mus., 45, 1913, p. 343, pl. 30, figs. 20, 21.

Silurian (Pembroke): Leighton Cove, Washington County, Maine.

Cotypes.—Cat. No. 58966, U.S.N.M.

ACTINOPTERIA EMACERATA Whitfield and Hovey. See *Pterinea emacerata*.

Actinopteria fornicata Williams.

Actinopteria fornicata Williams, Proc. U. S. Nat. Mus., 45, 1913, p. 343, pl. 30, figs. 14-16.

Silurian (Pembroke): Youngs Cove, Washington County, Maine.

Holotype.—Cat. No. 58965, U.S.N.M.

Actinopteria reticulata Weller.

Actinopteria reticulata Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 245, pl. 22, fig. 3.—Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 459, pl. 76, fig. 6.

Helderbergian: Near Tri States, New York (Decker Ferry); Keyser, West Virginia (Keyser).

ACTINOSTROMA Young and Young. See *Fenestella Lonsdale*.

ACTINOSTROMA Nicholson.

Genotype: *A. clathratum* Nicholson.

Actinostroma Nicholson, Mon. British Strom., Pal. Soc., 1886, p. 75.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 221.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 142.—Zittel-Eastman Textb. Pal., 1, 1900, p. 112; 2d ed., 1913, p. 122.

Actinostroma franklinense Parks.

Clathrodictyon franklinense Ami., Cruise of the "Neptune," 1906, p. 329 (nom. nud.). *Actinostroma franklinense* Parks, Univ. Toronto Studies, Geol. Ser. No. 6, 1909, p. 27, pl. 19, figs. 3, 4.

Niagaran: Beechy Island, Lancaster Sound, Canada.

ACTINOSTROMA INFLECTUM Parks. See *Actinostroma tenuifilatum inflectum*.

Actinostroma matutinum Nicholson.

Actinostroma matutinum Nicholson, Ann. Mag. Nat. Hist., 6th ser., 7, 1891, p. 322, pl. 9, figs. 1, 2.—Whiteaves, Canadian Rec. Sci., 7, 1895, p. 134.—Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 14.

Silurian: L'Anse au Gascon, Baie de Chaleur, Quebec.

Actinostroma tenuifilatum Parks.

Actinostroma tenuifilatum Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 10, pl. 9, figs. 1-3; *Ibid.*, No. 6, 1909, p. 25.

Niagaran: Ann Arbor, Michigan (drift); Drummonds Island, Lake Huron, Pagwachuan River, and Southampton Island, Hudson Bay, Canada.

Cotypes.—Cat. Nos. 36828, 36829, U.S.N.M.

Actinostroma tenuifilatum cylindricum Parks.

Actinostroma tenuifilatum var. *cylindricum* Parks, Univ. Toronto Studies, Geol. Ser., No. 6, 1909, p. 26.

Niagaran: Southampton Island, Hudson Bay, Canada.

Actinostroma tenuifilatum inflectum Parks.

Actinostroma inflectum Parks, Ottawa Nat., 22, 1898, p. 27; Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 11.

Actinostroma tenuifilatum infectum—Continued.

Actinostroma tenuifilatum var. *infectum*, Parks, Univ. Toronto Studies, Geol. Ser. No. 6, 1909, p. 25, pl. 19, figs. 1 and 2.

Niagaran: Pagwachuan River and Little Current River, Canada.

Actinostroma tenuissimum Parks.

Actinostroma tenuissimum Parks, Univ. Toronto Studies, Geol. Ser., No. 6, 1909, p. 42, pl. 18, figs. 2, 3, 9, and 12.

Cayugan (Cobleskill): Schoharie County, New York.

Actinostroma? trentonense Ulrich and Everett.

Actinostroma? trentonense Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 282, pl. 7, figs. 3a, b.

Black River (Platteville): Near Dixon, Illinois.

Sections of *holotype*.—Cat. No. 46545 U.S.N.M.

ACTINOSTROMA TRENTONENSIS Weller. See *Solenopora compacta*.

Actinostroma vulcana Parks.

Actinostroma vulcana Parks, Univ. Toronto Studies, Geol. Ser., No. 4, 1907, p. 10, pl. 1, figs. 1, 2, 5.

Niagaran (Guelph): Durham, Ontario.

Actinostroma whiteavesi niagarenses Parks.

Actinostroma whiteavesi var. *niagarenses* Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 11, pl. 12, figs. 4-5.

Niagaran (Lockport): Thorold, Ontario.

ÆCHMINA Jones and Holl.

Genotype: *A. cuspidata* Jones and Holl.

Æchmina Jones and Holl, Ann. Mag. Nat. Hist., 4th ser., 3, 1869, p. 217.—Zittel, Handb. Pal., 2, 1885, p. 557.—Vogdes, Ann. New York Acad. Sci., 5, 1889, p. 4, pl. 2, fig. 6.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 704.—Koken, Die Leitfossilien, Leipzig, 1896, p. 40.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 308.—Ulrich, Zittel-Eastman Textb., Pal., 1, 1900, p. 644.—Grabau, Bull. New York State Mus., 45, 9, 1901, p. 220; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 220.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 345.—Baesler, Zittel-Eastman Textb., Pal., 2d ed., 1913, p. 738.

Æchmina abnormis Ulrich.

Æchmina abnormis Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 183, pl. 12, figs. 7a, 7b.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 346, fig. 1660, h-j.

Clinton (Rochester): Lockport, etc. New York; Maryland, etc.

Holotype.—Cat. No. 41372, U.S.N.M.

ÆCHMINA BYRNESI Jones. See *Dicranella? byrnesi*.

Æchmina spinosa (Hall).

Cytherina spinosa Hall, Pal. New York, 2, 1852, p. 317, pl. 67, figs. 17-21.

Beyrichia spinosa Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 80 (gen. ref.).

Æchmina spinosa Jones and Holl, Ann. Mag. Nat. Hist., 4th ser., 3, 1869, p. 218 (gen. ref.).—Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 11, pl. 13, figs. 4-8.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 220, fig. 152; Bull. New York State Mus., 45, No. 9, 1901, p. 220, fig. 152.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 345, fig. 1659.

Clinton (Rochester): Lockport, Rochester, etc., New York; Ontario; Pennsylvania; Maryland.

Egilops Hall.Genotype: *Æ. subcarinata* Hall.*Egilops* Hall, 3d Rep. New York State Cab. Nat. Hist., rev. ed., 1850, p. 179 (doc. ed., p. 171).**Egilops subcarinata Hall.***Egilops subcarinata* Hall, 3d Rep. New York State Cab. Nat. Hist., rev. ed., 1850, p. 179, pl. 4., figs. 1a, b (doc. ed., p. 171).

Trenton: Near Lowville, Lewis County, New York.

Observation.—Not recognized. Founded on cast of undetermined pelecypod.

ÆONIA Burmeister. See *Proetus* Steininger.**ÆSIOCYSTIS** Bather. See *Æsiocystites* Miller and Gurley.**ÆSIOCYSTITES** Miller and Gurley.Genotype: *A. priscus* Miller and Gurley.*Æsiocystites* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 13.—

Miller, N. A. Geol. Pal., 2d App., 1897, p. 732.

Æsiocystis Bather, Treatise on Zoology (Lankester), pt. 3, 1900, p. 208.**Æsiocystites priscus** Miller and Gurley.*Æsiocystites priscus* Miller and Gurley, Bull. Illinois State Mus., 5, 1894, p. 14, pl. 2, figs. 10-12.—Miller, N. A. Geol. and Pal., 2d App., 1897, p. 732, text fig. 1281.

Trenton (Curdsville): Mercer County, Kentucky.

ÆTHOCYSTITES Miller.Genotype: *Æ. sculptus* Miller.*Æthocystites* Miller, N. A. Geol. Pal., 1st App., 1892, p. 673; 18th Ann. Rep.

Indiana Dep. Geol. Nat. Res., 1894, p. 263. (Adv. sheets, 1892, p. 9.)—

Bather, Treatise on Zoology (Lankester), pt. 3, 1900, p. 57.

Æthocystites sculptus Miller.*Æthocystites sculptus* Miller, N. A. Geol. Pal., 1st App., 1892, p. 673, fig. 1207; 18th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1894, p. 264, pl. 2, fig. 2. (Advance sheets, 1892, p. 10, pl. 2, fig. 2.)

Niagaran (Laurel): St. Paul, Indiana.

AGARICIA SWINDERNANA Goldfuss. See *Thecia swindernana*.**AGELACRINITES** Vanuxem.Genotype: *A. hamiltonensis* Vanuxem.*Agelacrinites* Vanuxem, Geol. Surv. New York, 3d dist., 1842, p. 158.—Beyrich, Neues Jahrb. f. Min., etc., 1846, p. 192.—Forbes, Mem. Geol. Surv. Great Britain, 2, pt. 2, 1848, p. 519.—Hall, Pal. New York, 2, 1852, p. 236 footnote.—Billings, Canadian Jour., 2, 1854, p. 271.—Chapman, Canadian Jour., n. s., 5, 1860, p. 358, 361; Ann. Mag. Nat. Hist., 3d ser., 6, 1860, p. 159; Expos. Min. Geol. Canada, 1864, p. 110.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 53 (footnote).—Salter, Mem. Geol. Surv. Great Britain, 3, 1866, p. 290; 2d ed. 1881, p. 481.—Barrande and Waagen, Syst. Sil. du Centre Boheme, 7, pt. 1, 1887, p. 83, pl. 37.—Jaekel, Stammesges. Pemat., 1, 1899, p. 49.—Zittel, Grundzuge Pal., 1, 1910, p. 182.*Agelacrinus* Pictet, Traite de Pal. 2d ed., 4, 1857, p. 305.—Hall, Pal. New York, 3, 1859 (1861), p. 152.—Zittel, Handb. Pal., 1, 1879, p. 414.—Stürtz, Neues Jahrb. f. Min., 2, 1886, p. 144.—Miller, N. A. Geol. Pal., 1889, p. 221.—Bather, Treatise on Zoology (Lankester), pt. 3, 1900, p. 207, fig. 3.—Clarke, Bull. New York State Mus., 49, 1901 (1902), p. 184.—Haeckel, Amphorideen u. Cystoideen, 1896, p. 112.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 472.—Springer, Zittel-Eastman Textb. Pal. 1, 1913, p. 169.—Foerste, Bull. Sci. Lab. Denison Univ. 17, 1914, p. 399.*Agelacrinus* (*Agelacrinites*) Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 353.*Agelacystis* Haeckel, Amphorideen u. Cystoideen, 1890, p. 114.

Agelacrinites austini (Foerste).

Agelacrinus austini Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 444, pl. 6, fig. 1.

Richmond (Whitewater): Four and one-half miles northwest Wilmington, Ohio.

AGELACRINITES (EDRIOASTER) BIGSBYI Chapman. See *Edrioaster bigsbyi*.

AGELACRINITES BILLINGSI Chapman. See *Hemicystites billingsi*.

Agelacrinites cincinnatiensis (Roemer).

Agelacrinus Cincinnatiensis Roemer, Verhdt. Nat. Hist. Ver. preuss. Rheinland, 8, 1851, p. 372, pl. 8, fig. 3.—Bronn, Leth. geog., 3d ed., 2, 1855, p. 277, pl. 4, fig. 6.—Hall, Desc. n. sp. Crin., etc., 1886, p. 6.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 3, fig. 16.—Zittel, Handb. Pal., 1, 1879, p. 414, fig. 291.—Miller, N. A., Geol. Pal., 1889, p. 222, fig. 241.—Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 476, pl. 1, fig. 6.

Agelacrinus (Lepidodiscus) Cincinnatiensis Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 214, pl. 6, fig. 7; Desc. n. sp. fossils, Cincinnati, Ohio, 1871, photographic pl. 2, fig. 7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 472, fig. 1784b.

Lepidodiscus cincinnatiensis Sharman and Newton, Quart. Jour. Geol. Soc. London, 48, 1892, p. 151.—Haeckel, Amphorideen u. Cystoideen, 1896, p. 113, fig. 16.—Bather, Treatise on Zool., pt. 3, Echinoderma, 1900, p. 207, fig. 4.

Agelacrinites (Lepidodiscus) Cincinnatiensis Meek, Geol. Surv. Ohio, Pal. 1, pt. 2, 1873, p. 55, pl. 3, fig. 6a, b.

Agelacrinites cincinnatiensis Jaekel, Stamm. Pelmat., 1, Thecoidea, u. Cystoidea, Berlin, 1899, p. 50, pl. 2, fig. 1.—Clarke, Bull. New York State Mus., 49, 1901, p. 185.

Maysville (Fairmount-Corryville): Cincinnati, Ohio, and vicinity; Indiana; Kentucky; Tennessee.

Agelacrinites dicksoni Billings.

Agelacrinites dicksoni Billings, Rep. Progress 1853-56, Geol. Surv. Canada, 1857, p. 294; Canadian Org. Rem., dec. 3, Geol. Surv. Canada, 1858, p. 84, pl. 8, fig. 3, 3a, 4, 4a.—Chapman, Expos. Min. Geol. Canada, 1864, p. 110.—Grant, Trans. Ottawa Field Nat. Club, 1, No. 2, 1881, fig. 9.—Jaekel, Stamm. Pelmat. 1, Thecoidea u. Cystoidea, 1899, p. 50, pl. 2, fig. 2.—Clarke, Bull. New York State Mus. 49, 1901, p. 191, fig. 3.

Agelacrinus Dicksoni Haeckel, Amphorideen u. Cystoideen, 1896, pl. 3, fig. 29.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 44 (loc. occ.).

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

Agelacrinites faberi (Miller).

Agelacrinus faberi Miller, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 156, pl. 8, figs. 24, 25.—Foerste, Bull. Sci. Lab. Denison Univ. 17, 1914, p. 441, pl. 1, fig. 3, pl. 3, fig. 4.

Lepidodiscus faberi Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 728, pl. 4, fig. 11.

Richmond (Whitewater): Between Osgood and Versailles, Indiana.

Agelacrinites holbrooki (James).

Agelacrinus Holbrooki James, Paleontologist, No. 1, 1878, p. 2; Jour. Cincinnati Soc. Nat. Hist., 10, 1897, p. 25, figs. A, B.—Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 446, pl. 1, fig. 1, pl. 4, fig. 1.

Agelacrinites holbrooki—Continued.

Agelacrinites Holbrooki Jaekel, Stammes. *Pelmat.*, 1, Thecoidea u. Cystoidea, Berlin, 1889, p. 50.—Clarke, *Bull. New York State Mus.*, 49, 1901, p. 189, fig. 2. Maysville(?Corryville): Near Lebanon (Morrow), Ohio.
Plesiotype.—Cat. No. 40744, U.S.N.M.

Agelacrinites pileus (Hall).

Agelacrinites (*Lepidodiscus*) *pileus* Hall., 24th Rep. New York State Cab. Nat. Hist., 1872, p. 214, pl. 6, figs. 8–10 (Adv. publication, 1866).
Lepidodiscus pileus Sladen, *Quart. Jour. Geol. Soc. London*, 1879, p. 750.
Agelacrinites pileus Miller and Faber, *Jour. Cincinnati Soc. Nat. Hist.*, 15, 1892, p. 85, pl. 1, fig. 10.—Foerste, *Bull. Sci. Lab. Denison Univ.*, 17, 1914, p. 482, pl. 2, figs. 1–4.
Agelacrinites pileus Meek, *Geol. Surv. Ohio, Pal.*, 1, 1873, p. 56, pl. 3, fig. 5.—Jaekel, Stammes, *Pelmatozoen*, 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 50, fig. 10, pl. 1, fig. 6.
Maysville (Fairmount-Corryville): Cincinnati, Ohio, and vicinity.

AGELACRINITES SEPTEMBRACHIATUS Jaekel. See *Streptaster septembrachiatus*.

Agelacrinites vetustus (Foerste).

Agelacrinites vetustus Foerste, *Bull. Sci. Lab. Denison Univ.*, 17, 1914, p. 439. Trenton (Cynthiana): Clays Ferry, Kentucky.

AGELACRINITES VORTICELLATA Meek. See *Streptaster vorticellatus*.

Agelacrinites warrenensis (James).

Agelacrinites warrenensis James, *Paleontologist*, No. 7, 1883, p. 58, pl. 2, figs. 3, 3a.—Foerste, *Bull. Sci. Lab. Denison Univ.*, 17, 1914, p. 448, pl. 1, fig. 4.
Maysville (Fairmount): Morrow, Ohio.
Observation.—Poorly defined and figured. Probably young specimens of *A. cincinnatiensis*.

AGELACRINUS of authors. See *Agelacrinites Vanuxem*.

AGELACRINUS BIGSBYI Schmidt. See *Edrioaster bigsbyi*.

AGELACRINUS BILLINGSI Chapman. See *Hemicystites billingsi*.

AGELACRINUS CINCINNATIENSIS of authors. See *Agelacrinites cincinnatiensis*.

AGELACRINUS DICKSONI Hæckel. See *Agelacrinites dicksoni*.

AGELACRINUS FABERI Miller. See *Agelacrinites faberi*.

AGELACRINUS HOLBROOKI James. See *Agelacrinites holbrooki*.

AGELACRINUS PARASITICA Hall. See *Hemicystites parasiticus*.

AGELACRINUS PILEUS of authors. See *Agelacrinites pileus*.

AGELACRINUS SEPTEMBRACHIATUS Miller and Dyer. See *Streptaster septembrachiatus*.

AGELACRINUS (HEMICYSTITES) STELLATUS Hall. See *Hemicystites stellatus*.

AGELACRINUS VORTICELLATA Hall. See *Streptaster vorticellatus*.

AGELACRINUS WARRENSIS James. See *Agelacrinites warrenensis*.

AGELACYSTIS Hæckel. See *Agelacrinites Vanuxem*.

AGNOSTUS Brongniart. Genotype: *Entomolitus paradoxus pisiformis* Linnaeus.
Agnostus Brongniart, Hist. Crust. Foss., 1822, p. 38.—DeKay, Ann. Lyceum Nat. Hist. New York, 1, 1824, p. 176, footnote.—Green, Mon. Tril. N. A., 1832, p. 17.—Murchison, Sil. Syst., 1839, p. 664.—Edwards, Hist. Nat. d. Crustacees, 3, 1840, p. 347.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, p. 541.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 528.—Salter, Mem. Geol. Surv. United Kingdom, dec. 11, 1864, pl. 1.—Salter, Mem. Geol. Surv. Great Britain, 3, 1866, p. 296 (ibid., 2d ed., 1881, p. 488).—Brögger, Nyt Mag. for Naturvid., 24, 1877, p. 61.—Angelin, Pal. Scandinavica, 3d ed., Holmiae, 1878, p. 5.—Tullberg, Sveriges, Geol. Unders., Ser. C, No. 42, 1880, p. 11.—Zittel, Handb. Pal., 2, 1885, p. 592.—Matthew, Trans. Royal Soc. Canada, 3, sec. 4, 1886, p. 67.—Miller, N. A. Geol. Pal., 1889, p. 526.—Vogdes, Amer. Geol., 9, 1892, pp. 377–383; Cal. Acad. Sci., Occ. Papers, 4, 1893, p. 262.—Beecher, Amer. Jour. Sci., 3d ser., 46, 1893, p. 143; Amer. Geol., 16, 1895, p. 175.—Matthew, Trans. New York Acad. Sci., 15, 1896, p. 207.—Koken, Die Leitfossilien, Leipzig, 1896, p. 14, fig. 6.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, pp. 104, 183, pl. 3, fig. 9.—Matthew, Trans. Royal Soc. Canada, 2d ser. 3, sec. 4, 1897, p. 170.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, pp. 10, 37, pl. 1, fig. 7.—Matthew, Amer. Geol., 27, 1901, p. 56.—Gronwall, Danmarks Geol. Unders., 2, Række, No. 13, 1902, p. 46.—Jaekel, Zeit. d. Deutsch. Geol. Gesell., 61, 1909, p. 380.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 710.

***Agnostus acadicus declivus* Matthew.**

Agnostus Acadicus var. *declivis* Matthew, Trans. Royal Soc. Canada, 3, sec. 4, 1886, p. 70, pl. 7, figs. 6a, b.—Vogdes, Amer. Geol., 9, 1892, p. 387, pl. 9, fig. 8.—Matthew, Trans. New York Acad. Sci., 15, 1896, p. 219, pl. 15, figs. 11a–d.
Agnostus cf. *declivis* Matthew, Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 223.
 Canadian (Bretonian—Div. C. 3b): McNeil Brook, Cape Breton, Nova Scotia.

***Agnostus americanus* Billings.**

Agnostus Americanus Billings, Canadian Nat. Geol., 5, 1860, p. 302, fig. 1 a, b; Geol. Canada, Geol. Surv. Canada, 1863, p. 233, figs. 250 a, b; Pal. Foss. 1, Geol. Surv. Canada, 1865, p. 395, fig. 372 a, b.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1880, p. 298.
 Ozarkian? (Levis—erratic): Point Levis, Quebec.

***Agnostus bisectus* Matthew.**

Agnostus bisectus Matthew, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 50, pl. 13, figs. 2 a, b.
 Canadian (Bretonian—Div. C. 3b): Navy Island, St. John, New Brunswick.

***Agnostus bolivianus* Hoek.**

Agnostus bolivianus Hoek, Neues Jahrb. Min., Geol., Pal., 34, 1912, p. 212, pl. 7, fig. 6.
 Lowest Ordovician: Salitre, Bolivia-Argentina boundary.

***Agnostus canadensis* Billings.**

Agnostus Canadensis Billings, Canadian Nat. Geol., 5, 1860, p. 304, fig. 3 a, b; Geol. Canada, Geol. Surv. Canada, 1863, p. 233, fig. 252 a, b; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 397, fig. 374 a, b.—Brögger, Geol. Foren. Stockholm Forhandl., 8, 1886, p. 207.—Vogdes, Amer. Geol., 9, 1892, p. 390, pl. 9, fig. 9.
 Ozarkian? (Levis—erratic): Point Levis, Quebec.

Agnostus communis Hall and Whitfield.

Agnostus communis Hall and Whitfield, U. S. Geol. Expl. 40th Parl., 4, 1877, p. 228, pl. 1, figs. 28, 29.—Walcott, Mono. U. S. Geol. Surv., 8, 1884, p. 27.—Brögger, Geol. Foren. Stockholm Forhandl., 8, 1886, p. 207.—Vogdes, Amer. Geol., 9, 1892, p. 390, pl. 9, fig. 15.

Cambrian and ?Ordovician (Pogonip): White Pine and Eureka Districts, Nevada.

AGNOSTUS CYCLOPYGE Tullberg. See *Lejopyge cyclopyge*.

Agnostus fabius Billings.

Agnostus Fabius Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 298, text fig. 289.—Vogdes, Amer. Geol., 9, 1892, p. 396, pl. 9, fig. 10.

Chazy (Quebec—N, P): Table Head, Pistolet Bay and four miles northeast Port. land Creek, Newfoundland.

AGNOSTUS GALBA Billings. See *Arthrorachis galba*.

AGNOSTUS LATUS Vanuxem. See *Beyrichia lata*.

Agnostus orion Billings.

Agnostus Orion Billings, Canadian Nat. Geol., 5, 1860, p. 304, fig. 2; Geol. Canada, Geol. Surv. Canada, 1863, p. 233, fig. 251.—Shumard, Trans. Acad. Sci. St. Louis, 2, 1863, p. 105.—Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 397, fig. 373.—Vogdes, Amer. Geol., 9, 1893, p. 391, pl. 9, fig. 12.

Ozarkian? (Levis-erratic): Point Levis, Quebec.

Agnostus pisiformis (Linnaeus).

Entomolitus paradoxus pisiformis Linnaeus, Inter Scan., 1757, p. 122.

Agnostus pisiformis Brongniart, Crust. foss., 1822, p. 38.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 1, fig. 2a.—Tullberg, Sveriges Geol. Unders., Ser. C, No. 42, 1880, p. 25, pl. 2, fig. 14.—Salter, Mem. Geol. Surv. Great Britain, 2d ed., 1881, p. 489.—Brögger, Die sil. Etagen 2-3, Kristiania, 1882, p. 55 (cites bibliography).—Wallerius, Unders. Zonen med *Agnostus laevigatus* i Västergötland, Lund, 1895, p. 43.—Koken, Die Leitfossilien, Leipzig, 1896, p. 11, fig. 6; p. 347, fig. 242, 1.

Agnostus pisiformis var. *Matthew*, Trans. Roy. Soc. Canada, 9, sec. 4, 1892, p. 59, pl. 13, fig. 1a, b; *ibid.*, 1898, p. 138, pl. 2, figs. 1a-c.

Lower Ordovician: Europe.

Canadian (Bretonian—Div. C3a): Long Island, Kennebecasis River, New Brunswick.

Agnostus pisiformis affinis Matthew.

Agnostus pisiformis mut. *affinis* Matthew, Trans. Royal Soc. Canada, 2d ser., 4, sec. 4, 1898, p. 137, pl. 2, fig. 3.

Canadian (Bretonian—Div. C3a): Kennebecasis Valley, New Brunswick.

Agnostus pisiformis rugulosus Matthew.

Agnostus pisiformis mut. *rugulosus* Matthew, Trans. Royal Soc. Canada, 2d ser., 4, sec. 4, 1898, p. 137, pl. 2, fig. 2.

Canadian (Bretonian—Div. C3a): Kennebecasis Valley, New Brunswick.

Agnostus pisiformis validus Matthew.

Agnostus pisiformis mut. *valida* Matthew, Trans. Royal Soc. Canada, 2d ser., 4, sec. 4, 1898, p. 137.

Canadian (Bretonian—Div. C3a): Kennebecasis Valley, New Brunswick.

Agnostus sidenbladhi Linnarsson.

Agnostus Sidenbladhi Linnarsson, Vesterg. Cambr., etc., 1869, p. 82, pl. 2, figs. 60, 61 (K. Sv. Vet. Akad. Handl.); Ofvers. K. Vet.-Akad. Forhandl., 26, 1869, p. 195.—Brögger, Die Sil. Etagen 2-3, Kristiania, 1882, p. 56 (cites bibliography).

Canadian: Europe; Point Levis, Quebec (*Levis-Diplograptus dentatus* zone) [Raymond].

Agnostus trisectus Salter.

Agnostus trisectus Salter, Mem. Geol. Surv., dec. 11, 1864, p. 10, pl. 1, fig. 11.—Belt, Geol. Mag., 5, 1868, p. 11.—Salter, Cat. Camb. Sil. Foss., 1873, p. 10.—Linnarsson, Geol. For. Stockholm Forhandl., 5, 1880, p. 157, p. 6, fig. 16.—Tullberg, Sveriges Geol. Unders., Ser. C, No. 42, 1880, p. 24, pl. 1, fig. 13.—Linnarsson, *ibid.*, No. 43, 1880, p. 27, pl. 2, fig. 16.—Matthew, Trans. Royal Soc., Canada, 11, sec. 4, 1894, p. 110.—Groom, Quart. Jour. Geol. Soc., London, 58, 1902, p. 119.

Lower Ordovician: Europe.

Canadian (Bretonian—Div. C 3b): McNeil Brook, Cape Breton, Nova Scotia.

Agnostus trisectus germanus Matthew.

Agnostus trisectus mut. *germanus* Matthew, Bull. Nat. Hist. Soc. New Brunswick, No. 19, 1901, p. 279; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 221.

Canadian (Bretonian—Div. C 3b): East Bay, east of Bras d'Or Lake, Cape Breton, Nova Scotia.

Agnostus trisectus ponepunctus Matthew.

Agnostus trisectus mut. *ponepunctus* Matthew, Bull. Nat. Hist. Soc. New Brunswick, No. 19, 1901, p. 278, pl. 5, fig. 8a-c; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 220, pl. 17, figs. 8a-c.

Canadian (Bretonian—Div. C 3b): McAdam shore, East Bay, Bras d'Or Lake, Cape Breton, Nova Scotia.

AGNOSTUS TUBERCULATUS Quenstedt. See *Beyrichia tuberculata*.

Agnostus tumidosus Hall and Whitfield.

Agnostus tumidosus Hall and Whitfield, U. S. Geol. Expl. 40th Parl., 4, 1877, p. 231, pl. 1, fig. 32.—Brögger, Geol. Foren Stockholm Forhandl., 8, 1886, p. 204.—Vogdes, Amer. Geol., 9, 1892, p. 393, pl. 10, fig. 8.—Walcott, Mono. U. S. Geol. Surv., 32, pt. 2, 1899, p. 455, pl. 63, figs. 5, 5a.

Cambrian and ?Ordovician (Pogonip): Eureka District, Nevada.

AGRAULOS CYLINDRICUS Miller. See *Arionellus cylindricus*.

AGRAULOS OWENI Meek and Hayden. See *Ptychoparia oweni*.

AGRAULOS (ARIONELLUS) PUSTULATUS Vogdes. See *Glaphurus pustulatus*.

AGRAULOS SARATOGENSIS Walcott. See *Plethopeltis saratogensis*.

ALECTO Lamouroux. See *Stomatopora Bronn*.

ALECTO AULOPOROIDES Nicholson. See *Proboscina auloporoides*.

ALECTO CONFUSA Nicholson. See *Proboscina confusa*.

ALECTO FRONDOSA Nicholson. See *Proboscina frondosa*.

ALECTA INFLATA Hall. See *Corynotrypa inflata*.

ALECTO NEXILIS James. See *Batostoma implicatum*.

ALEPIDASTER Meek. Genotype: *Protaster? granuliferus* Meek.

Alepidaster Meek, Amer. Jour. Sci., 3d ser., 4, 1872, p. 275; Geol. Surv. Ohio, Pal., 1, 1873, p. 68.—Schuchert, Bull. U. S. Nat. Mus., 88, 1915, p. 228.

Protasterina Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 95—James, *ibid.*, 18, 1895, p. 139. (Genotype: *P. fimbriata* Ulrich).

Alepidaster fimbriatus (Ulrich).

Protasterina (*Protaster*) *fimbriata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 95, pl. 4, figs. 9, 9a, 9b, 9c.

Protasterina fimbriata James, *ibid.*, 18, 1895, p. 139.

Eden (Economy): Covington, Kentucky.

Alepidaster flexuosus (Miller and Dyer).

Protaster flexuosus Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 31, pl. 2, figs. 1, 1a.—Miller, N. A. Geol. Pal., 1889, p. 276, fig. 409.—Parks, Trans. Canadian Inst., 8, 1908, p. 368.

Protasterina flexuosa James, Jour. Cincinnati Soc. Nat. Hist., 18, 1896, p. 140.

Alepidaster flexuosus Schuchert, in Frech, Foss. Cat., 1, Anim., pt. 3, 1914, p. 11; Bull. U. S. Nat. Mus., 88, 1915, p. 231, pl. 36, fig. 4.

Maysville: Cincinnati, Ohio.

Alepidaster granuliferus (Meek).

Protaster? granuliferus Meek, Amer. Jour. Sci., 3d ser., 4, 1872, p. 274; Geol. Surv. Ohio, Pal., 1, 1873, p. 68, pl. 3 bis., figs. 8a, b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 775, figs.—James, Jour. Cincinnati Soc. Nat. Hist., 23, 1896, p. 138.—Parks, Trans. Canadian Inst., 8, 1908, p. 368.

Tæniaster granuliferus Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 733, pl. 3, fig. 7.

Alepidaster granuliferus Schuchert, in Frech, Foss. Cat., 1, Anim., pt. 3, 1914, p. 11; Bull. U. S. Nat. Mus., 88, 1915, p. 230, fig. 26.

Richmond: Moore's Hill, Indiana.

Alepidaster miamiensis (Miller).

Protaster miamiensis Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1872, p. 116, pl. 5, figs. 6, 6a, 6b.—James, *ibid.*, 18, 1895, p. 138.—Parks, Trans. Canadian Inst., 8, 1908, p. 368.

Alepidaster miamiensis Schuchert, in Frech, Foss. Cat., 1, pt. 3, 1914, p. 11; Bull. U. S. Nat. Mus., 88, 1915, p. 233.

Richmond (Waynesville or Liberty): Near Waynesville, Ohio.

Cotypes.—Cat. No. 40686, U.S.N.M.

ALLOCRINUS Wachsmuth and Springer.

Genotype: *A. typus* Wachsmuth and Springer.

Alloccrinus Wachsmuth and Springer in Miller, N. A. Geol. Pal., 1889, p. 222; Geol. Surv. Illinois, 8, 1890, p. 206; Proc. Acad. Nat. Sci. Philadelphia, 1890, p. 376; Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 306.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 162.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 148.—Zittel, Grundzuge Pal., 1, 1910, p. 162.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 191.

Alloccrinus benedicti Miller.

Alloccrinus benedicti Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 647, pl. 7, fig. 1 (Adv. sheets, 1891, p. 37); N. A. Geol. Pal., 1st App., 1892, p. 674, fig. 1210.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 308, pl. 24, fig. 8a, b.

Niagaran (Laurel): St. Paul, Indiana.

Alloerinus typus Wachsmuth and Springer.

Alloerinus typus Wachsmuth and Springer, Geol. Surv. Illinois, 8, 1890, p. 207, pl. 14, figs. 7, 7a, b; Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 307, pl. 24, fig. 7a, b.

Niagaran (Brownsport): Wayne and Decatur Counties, Tennessee.

ALLOCYSTITES Miller.

Genotype: *A. hammelli* Miller.

Alloecystites Miller, N. A. Geol. Pal., 1889, p. 222.—Jaekel, *Stammes. Pelmat.*, 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 398.—Zittel, *Grundzuge Pal.*, 1, 1910, p. 72.

Alloecystites hammelli Miller.

Alloecystites hammelli Miller, N. A. Geol. Pal., 1889, p. 222, fig. 242.—Jaekel, *Stammes. Pelmat.*, 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 398.

Clinton (Osgood): Jefferson County, Indiana.

ALLODESMA Ulrich.

Genotype: *Modiolopsis subelliptica* Ulrich.

Modiolopsis (part) Ulrich, 19th Ann. Rep. Geol. and Nat. Hist. Surv. Minnesota, 1892, p. 226.

Allodesma Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 617.—Dall, *Zittel-Eastman Textb. Pal.*, 1, 1900, p. 393; *ibid.*, 2d ed., 1913, p. 470.

Allodesma subellipticum (Ulrich).

Modiolopsis subelliptica Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv., Minnesota, 1892, p. 226, fig. 12.

Allodesma subellipticum Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 617, pl. 42, figs. 9-14.—Ruedemann, *Bull. New York State Mus.*, 162, 1912, p. 103, pl. 6, fig. 11.

Trenton: Near Cannon Falls, Minnesota (Proesser); Canajoharie, New York (Canajoharie).

Holotype and *plesiotype*.—Cat. No. 46078, U.S.N.M.

ALLONEMA Ulrich and Bassler.

Genotype: *A. botelloides* Ulrich and Bassler.

Allonema Ulrich and Bassler, *Smith. Misc. Coll. (Quart. Issue)*, 45, 1904, p. 276-279.—Bassler, *Bull. U. S. Geol. Surv.*, 292, 1906, p. 12.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 118.—Bassler, *Zittel-Eastman Textb. Pal.*, 1913, p. 318.

Allonema waldronense Ulrich and Bassler.

Allonema waldronense Ulrich and Bassler, *Smith. Misc. Coll. (Quart. Issue)*, 45, 1904, p. 283, pl. 67, fig. 5.—Bassler, *Bull. U. S. Geol. Survey*, 292, 1906, p. 13, pl. 4, fig. 9.

Niagaran: Waldron, Indiana (Waldron); Middleport, New York (Rochester).

Holotype.—Cat. No. 43128, U.S.N.M.

ALLONYCHIA Ulrich.

Genotype: *Ambonychia* (*Megambonia*) *jamesi* Meek.

Megambonia Meek (not Hall, 1859), *Proc. Acad. Nat. Sci.*, Philadelphia, 1872, p. 321.

Allonychia Ulrich, Geol. Surv. Ohio, 7, 1893, p. 640.—Cumings, 32d Ann. Rep., Dep. Geol. Nat. Res. Indiana, 1908, p. 978.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1909, p. 432.

Allonychia flanaganensis Foerste.

Allonychia flanaganensis Foerste *Bull. Sci. Lab. Denison Univ.* 17, 1912, p. 30; *Jour. Cincinnati Soc. Nat. Hist.*, 21, 1914, p. 134, pl. 2, fig. 1.

Trenton (Cynthiana): Flanagan, etc., Kentucky.

***Allonychia jamesi* (Meek).**

Megambonia jamesi Meek, Proc. Acad. Nat. Sci. Philadelphia, 1872, p. 321; Geol. Surv. Ohio, Pal. 1, 1873, p. 136, pl. 12, figs. 9a, b.—Miller, Cincinnati Quart. Jour. Sci., 1, 1873, p. 13; *ibid.* 1874, p. 225.

Ambonychia jamesi Miller, N. A. Geol. Pal., 1889, p. 460 (gen. ref.)

Allonychia jamesi Ulrich, Geol. Surv. Ohio, 7, 1893, p. 641, pl. 48, fig. 7.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 986, pl. 43, fig. 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 432.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

Plenotype.—Cat. No. 46079, U.S.N.M.

***Allonychia ovata* Ulrich.**

Allonychia ovata Ulrich, Geol. Surv. Ohio, 7, 1893, p. 641, pl. 48, figs. 4-6.

Maysville (Fairmount): Covington, Kentucky.

Holotype.—Cat. No. 46080 U.S.N.M.

***Allonychia subrotunda* Ulrich.**

Allonychia subrotunda Ulrich, Geol. Surv. Ohio, 7, 1893, p. 642, pl. 48, figs. 8, 9.

Maysville (Corryville): Cincinnati, Ohio.

Holotype.—Cat. No. 46081, U.S.N.M.

ALVEOLITES Lamarck.

Genotype: *A. suborbicularis* Lamarck.

Alveolites Lamarck, Syst. des Anim. sans. Vert., 1801, p. 375.—Steininger, Mem. Soc. Geol. France, 1, 1834, p. 333.—Koninck, Desc. Animaux Fossiles, Leige, 1842, p. 11.—Dana, Wilkes' U. S. Expl. Exped. 1838-42, 7, Zoophytes, 1846, p. 537.—Edwards and Haime, Compt. Rend. l'Acad. Sci., 29, 1849, p. 260.—King, Mon. Permian Foss. England, Pal. Soc., 1850, p. 29.—Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist., 5), 1851, p. 153; McCoy, British Pal. Rocks Foss., 1854, p. 68.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 442.—Billings, Canadian Jour., n. s., 4, 1858, p. 114.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 263.—Rominger, Amer. Jour. Sci. and Arts, 2d ser., 34, 1862, p. 390.—Duncan, Rep. 41st Meeting British Assoc. Adv. Sci., 1872, p. 132.—Salter, Cat. Camb. Sil. Foss., 1873, p. 106.—Nicholson, Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 53; Geol. Mag., dec. 2, 1, 1874, p. 14.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 40.—Nicholson, Trans. Royal Soc. Edinburgh, 27, 1876, p. 247.—Nicholson and Etheridge, Jour. Linnean Soc. London, Zool., 13, 1877, p. 353, 354.—Nicholson, Tab. Corals, 1879, p. 117.—Zittel, Handb. Pal., 1, 1880, p. 618.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 441.—Hall and Simpson, Pal. New York 6, 1887, p. xiii.—Nicholson, Geol. Mag., dec. 3, 5, 1888, p. 107.—Miller, N. A. Geol. Pal., 1889, p. 170.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 20.—James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 4, 1893, pp. 147, 148.—Sardecson, Neues Jahrb. Min., Geol., Pal., Beilage-Band, 10, 1896, p. 315.—Zittel-Eastman Textb. Pal., 1, 1900, p. 100.—Pocta, Syst. Sil. du Centre Boheme, 8, pt. 2, 1902, p. 266.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 91.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 114.

***Alveolites? arcticus* Woodward.**

Alveolites? arctica Woodward, Geol. Mag., dec. 2, 5, 1878, p. 289, pl. 10, fig. 7.

Niagaran: Beechy Island, Arctic America.

ALVEOLITES EXPANSA James. See *Ceramopora? expansa*.

ALVEOLITES EXSUL Hall. See *Lioclema? exsul*.

***Alveolites fibrosus* Davis.**

Alveolites fibrosus Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 46, fig. 8.

Niagaran (Louisville): Near Louisville, Kentucky.

ALVEOLITES GRANULOSUS James. See *Stromatocerium huronensis*.

ALVEOLITES HEMISPHERICUS D'Orbigny.

Alveolites hemispherica D'Orbigny, Prodr. Pal., 1, 1849, p. 49.—Boule and Thevenin, Ann. Pal., 1, 1906, p. 8, pl. 4, figs. 1-4.

Silurian(?): Falls of the Ohio.

Observation.—The figures given by Boule and Thevenin refer to a Devonian species.

Alveolites inornatus Foerste.

Alveolites inornatus Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 103, pl. 3, fig. 56.

Niagaran (Brownsport): East of Linden, Tennessee.

ALVEOLITES IRREGULARIS Whitfield. See *Ceramoporella? irregularis*.

Alveolites labechei Edwards and Haime.

Alveolites labechei Edwards and Haime, Polyp. Foss. d. Terr. Pal., 1851, p. 257.—

Milne-Edwards and Haime, Brit. Foss. Corals, 1855, p. 262, pl. 61, figs. 6a-b.—

Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 33 (loc. ref.).—

Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 21.—

Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 285.

Silurian: Great Britain and Russia; Anticosti (Jupiter River) and Manitoulin Islands, Canada (Niagaran).

Alveolites louisvillensis Davis.

Alveolites louisvillensis Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 46, figs. 5, 6.

Niagaran: Louisville, Kentucky (Louisville); West Tennessee (Brownsport).

Cotype.—Cat. No. 52754 U.S.N.M.

Alveolites? niagarensis Nicholson and Hinde.

Alveolites Niagarensis Nicholson and Hinde (not Rominger), Canadian Journal, n. s., 14, 1874, p. 152, fig. 3.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 56, fig. 27.

Niagaran (Lockport): Rockford, Ontario.

Observation.—Probably a species of *Cladopora*.

ALVEOLITES NIAGARENSIS Rominger. See *Alveolites undosus*.

ALVEOLITES PEGRAMENSIS Foerste. See *Pachypora (Platyaxum) pegramensis*.

Alveolites repens (Fought).

Millepora repens Fought, Amoen Acad., 1, 1749, p. 99.

Alveolites repens Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal., 1851

(Arch. du Mus. d'Hist. Nat., 5), p. 258.—Mon. British Foss. Corals, Pal. Soc.,

1854, p. 263, pl. 62, figs. 1, 1a.—Roemer, Sil. Fauna West Tennessee, 1860,

p. 22, pl. 2, fig. 13, 13a.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 268.

Silurian: Gotland and England;? West Tennessee.

Observation.—Roemer's reference is to some *Cladopora* probably distinct from *Alveolites repens* (Fought).

ALVEOLITES REPENS Billings. See *Coenites juniperina*.

Alveolites? seriopora Edwards and Haime.

Alveolites? seriopora Edwards and Haime, Mon. Polyp. Foss. Terr. Pal., 1851 (Arch. Mus. Hist. Nat., 5), p. 260.

Silurian: Dudley, England; Bear Grass Creek near Louisville, Kentucky.

Observation.—Not recognized as an American species.

ALVEOLITES STROMATOPOROIDES Rominger. See *Dictyostroma undulatum*.

Alveolites thoroldensis Parks.

Alveolites thoroldensis Parks, Univ. Toronto Studies, Geol. Ser. No. 5, 1908, p. 59, pl. 15, figs. 5 and 6.

Niagaran: Louisville, Kentucky (Louisville); Thorold, Ontario (Lockport).

Alveolites undosus Miller.

Alveolites niagarensis Rominger (not Nicholson and Hinde), Geol. Surv. Michigan, 3, pt. 2, 1876, p. 40, 41, fig., pl. 16, figs. 1, 2.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 46, fig. 7.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 336.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 22.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 91.

Alveolites undosus Miller, N. A. Pal. Foss. (2d ed.), 1883, p. 262.

Niagaran: Drummond Island, Lake Huron; Point Detour, Michigan; Lake Temiscaming, Saskatchewan River, etc., Quebec; Falls of the Ohio (Louisville); Dayton, Ohio; West Tennessee (Brownsport).

AMBONYCHIA of authors. See *Byssonychia* and *Clionychia* Ulrich.

AMBONYCHIA Hall.

Genotype: *A. bellistriata* Hall.

Ambonychia (part) Hall, Pal. New York, 1, 1847, p. 163.—McCoy, British Pal. Rocks and Foss., 1854, p. 264.—Woodward, Man. Mollusca, 2, 1854, p. 261.—Hall, Pal. New York, 3, 1859, pp. 14, 272, 523; 12th Rep. New York State Cab. Nat. Hist., 1859, pp. 8, 110.—Zittel, Handb. Pal., 2, 1881, p. 35.—Miller, N. A. Geol. Pal., 1889, p. 460.—Koken, Die Leitfossilien, Leipzig, 1896, p. 185.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 489.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 429.

AMBONYCHIA ACUTIROSTRA Hall. See *Mytilarca acutirostra*.

Ambonychia affinis Ulrich.

Ambonychia affinis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 492, pl. 35, figs. 5-7. Trenton (Prosser): Near Spring Valley, Minnesota; Carroll County, Illinois. *Cotype*.—Cat. No. 46083, U.S.N.M.

AMBONYCHIA (MEGAPTERA) ALATA Meek. See *Anomalodonta alata*.

Ambonychia amygdalina Hall.

Ambonychia amygdalina Hall, Pal. New York, 1, 1847, p. 165, pl. 36, figs. 6a-c.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 493, pl. 35, figs. 8, 9.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 430, fig. 561c-d.

Palæarca? *amygdalina* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 65 (gen. ref.).

Cypricardites amygdalina Miller, N. A. Geol. Pal., 1889, p. 476 (gen. ref.).—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 22, fig.

Posidonomya amygdalina Emmons, Amer. Geology, 1, pt. 2, 1855, p. 177, pl. 13, figs. 20, 21.

Cleionychia amygdalina Ulrich, Amer. Geol., 10, 1892, p. 97 (gen. ref.).

Trenton: Adams, Jefferson County, New York; Goodhue County, Minnesota (Prosser).

Pteriotype.—Cat. No. 46085, U.S.N.M.

AMBONYCHIA APHÆA Hall. See *Streptomytilus aphæa*.

AMBONYCHIA ATTENUATA of authors. See *Clionychia lamelloea*.

Ambonychia bellistriata Hall.

Ambonychia bellistriata Hall, Pal. New York, 1, 1847, p. 163, pl. 36, figs. 4a-d.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 819, fig. 605.—Zittel, Handb. Pal., 2, Munich, 1881, p. 35, fig. 42a.—Lesley, Geol. Surv. Pennsylvania, Rep., P. 4, 1889, p. 22, fig.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 492, pl. 35, figs. 1 and 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 430, fig. 561a, b.

Posidonomya bellistriata Emmons, Amer. Geology, 1, pt. 2, 1855, p. 176, pl. 13, figs. 5, 6.

Trenton: Middleville and Trenton Falls, New York; near Wykoff, Minnesota (Prosser).

Plesiotype.—Cat. No. 46084, U.S.N.M.

AMBONYCHIA BELLISTRIATA Miller. See *Byssonychia vera*.

AMBONYCHIA CARINATA Hall. See *Byssonychia carinata*.

AMBONYCHIA (MEGAPTERA) CASEI Meek and Worthen. See *Opisthoptera casei*.

AMBONYCHIA (MEGAPTERA) CASEI? Meek. See *Opisthoptera fissicosta*.

AMBONYCHIA CINCINNATIENSIS Miller and Faber. See *Byssonychia vera*.

AMBONYCHIA COSTATA James. See *Anomalodonta costata*.

Ambonychia? curvata Raymond.

Ambonychia? curvata Raymond, Amer. Jour. Sci., 20, 1905, p. 373.

Chazy (Day Point, Crown Point): Chazy, Valcour and Sloop Islands, New York.

AMBONYCHIA ERECTA Hall. See *Clionychia erecta*.

AMBONYCHIA EXCAVATA Miller. See *Clionychia excavata*.

Ambonychia illinoisensis Worthen.

Ambonychia illinoisensis Worthen, Geol. Surv. Illinois, 6, 1875, p. 495, pl. 23, figs. 4a-b.

Richmond (Maquoketa): Savannah County, Illinois.

AMBONYCHIA INTERMEDIA Meek and Worthen. See *Byssonychia intermedia*.

AMBONYCHIA JAMESI Miller. See *Allonychia jamesi*.

AMBONYCHIA LAMELLOSA of authors. See *Clionychia lamellosa*.

AMBONYCHIA MAXIMA Safford.

Ambonychia maxima Safford, Geol. Tennessee, 1869, p. 287 (not defined).

Middle Nashville: Central Tennessee.

AMBONYCHIA MYTILOIDES Hall. See *Clionychia mytiloides*.

AMBONYCHIA NEGLECTA McChesney. See *Amphicoelia neglecta*.

AMBONYCHIA NITIDA Billings. See *Mytilarca nitida*.

AMBONYCHIA OBESA Miller. See *Byssonychia obesa*.

AMBONYCHIA OBTUSA Hall. See *Cyrtodonta obtusa*.

Ambonychia orbicularis (Emmons).

Pterinea orbicularis Emmons, Nat. Hist. New York, Geol., 2, 1842, pp. 395, 397, fig. 3.—Owen, Amer. Jour. Sci. and Arts, 47, 1844, pp. 368, 369, fig. 3.

Ambonychia orbicularis—Continued.

Posidonomya orbicularis Emmons, Amer. Geol., 1, pt. 2, 1855, p. 176, pl. 13, figs. 18, 19.

Ambonychia orbicularis Hall, Pal. New York, 1, 1847, p. 164, pl. 36, figs. 5a-d.—Emmons, Man. Geol., 1860, p. 99, fig. 88.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 22, fig.

Trenton: Watertown and Middleville, New York.

AMBONYCHIA PERANGULATA Miller. See *Pailonychia perangulata*.

Ambonychia planistriata Hall.

Ambonychia planistriata Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 32.—Ulrich Geol. Minnesota, 3, pt. 2, 1894, p. 491, pl. 35, figs. 3 and 4.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 58, pl. 7, figs. 3, 4.

Black River (Platteville): Mineral Point and Beloit, Wisconsin; Cannon Falls, Minnesota; Lee County, Illinois.

Pterotype.—Cat. No. 46086, U.S.N.M.

AMBONYCHIA RADIATA of authors. See *Byssonychia radiata*.

AMBONYCHIA RAUCHI McChesney.

Ambonychia Rauchi McChesney, Desc. New Fossils, 1860, p. 89.

Maysville or Richmond: Madison, Indiana.

Observation.—Probably refers to some species of *Byssonychia*, but description is too poor for identification.

AMBONYCHIA RETRORSA Miller. See *Byssonychia retrorsa*.

AMBONYCHIA ROBUSTA Miller. See *Byssonychia robusta* and *B. richmondensis*.

Ambonychia septentrionalis Whiteaves.

Ambonychia septentrionalis Whiteaves, Geol. Surv. Canada, Ann. Rep. (n. s.), 14, App. F, 1904, p. 46; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 255, pl. 28, fig. 5.

Niagaran: Ekwan River, Canada.

AMBONYCHIA STRIÆCOSTA McChesney. See *Pterinea striæcosta*.

AMBONYCHIA SUBUNDATA Miller. See *Clionychia subundata*.

AMBONYCHIA SUPERBA Billings. See *Clionychia superba*.

AMBONYCHIA SWANANA Safford.

Ambonychia Swanana Safford, Geol. Tennessee, 1869, p. 287 (nom. nud.).

Upper Nashville: Central Tennessee.

AMBONYCHIA TENUISTRIATA Miller. See *Byssonychia tenuistriata*.

AMBONYCHIA UNDATA Hall. See *Clionychia undata*.

Ambonychia undulata (Whitfield).

Leptodomus undulatus Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1877, 1878, p. 81; Geol. Wisconsin, 4, 1882, p. 293, pl. 18, figs. 1, 2.

Ambonychia undulata Whiteaves, Ann. Rep. Geol. Surv. Canada (n. s.), 14, App. F, 1904, p. 46; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 254, pl. 28, fig. 4.

Niagaran: Wauwatosa, Wisconsin (Racine); Ekwan River, Canada.

AMPHERISTOCRINUS Hall.Genotype: *A. typus* Hall

Ampheristocrinus Hall, 11th Ann. Rep. Indiana Dept. Geol. Nat. Hist., 1882, p. 278, fig.—Trans. Albany Inst., 10, 1883, p. 67, fig. (Preliminary notice, 1879).—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, pp. 115, 143.—Miller, N. A. Geol. Pal., 1889, p. 223.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 332, pl. 14, fig. 18; Treatise on Zoology, pt. 3, Echinoderma, London, 1900, p. 173.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 67.

***Ampheristocrinus? calyx* (Hall).**

Poteriocrinus? calyx Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 266, pl. 15, fig. 14; Trans. Albany Inst., 10, 1883, p. 66 (Preliminary notice, 1879).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 740, fig.

Niagaran (Waldron): Waldron, Indiana.

***Ampheristocrinus dubius* Weller.**

Ampheristocrinus dubius Weller, Bull. Chicago Acad. Sci., 4, 1900, p. 67, pl. 14, fig. 11.

Niagaran (Racine): Romeo, Illinois.

***Ampheristocrinus typus* Hall.**

Ampheristocrinus typus Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 278, pl. 15, figs. 17, 18; Trans. Albany Inst., 10, 1883, p. 67 (Preliminary notice, 1879).—Miller, N. A. Geol. Pal., 1889, p. 223, text fig. 243.—Weller, Bull. Chicago Acad. Sci., 4, 1900, p. 68.

Niagaran (Waldron): Waldron, Indiana.

AMPHICÆLIA Hall.Genotype: *A. leidy* Hall.

Amphicælia Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, (extras, 1865) p. 339; Rev. ed., p. 386.—Meek and Worthen, Geol. Surv. Illinois, 2, 1866, p. 339, footnote; 3, 1868, p. 357.—Meek, Amer. Jour. Sci. Arts, 2d ser., 44, 1867, p. 173, footnote.—Miller, N. A. Geol. Pal., 1889, p. 461.

***Amphicælia costata* (Hall and Whitfield).**

Amphicælia (*Leptodomus?*) *costata* Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 140, pl. 7, fig. 23.

Amphicælia costata Miller, N. A. Geol. Pal., 1889, p. 461, fig. 773.

Niagaran (Cedarville): Cedarville, Greene County, Ohio.

***Amphicælia leidy* Hall.**

Amphicælia leidy Hall, 20th Rep. New York State Cab. Nat. Hist., 1868 (extras, 1865), p. 339, pl. 14 (5), figs. 13–15, p. 387; Rev. ed., 1870, p. 387, pl. 14, figs. 13–15; p. 431, fig.; 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, pl. 27, figs. 1, 2; mus. ed. 1879, p. 171, pl. 27, figs. 1, 2; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 313, pl. 28, figs. 1, 2.

Leptodomus (*Amphicælia*) *leidy* Whitfield, Geol. Wisconsin, 4, 1882, p. 357 (gen. ref.)

Niagaran: Racine and Wauwatosa, Wisconsin; Bridgeport, Illinois (Racine); Waldron, Indiana; and Newsom, Tennessee (Waldron).

***Amphicælia neglecta* (McChesney).**

Ambonychia neglecta McChesney, Desc. New Fossils, 1861, p. 88.

Pterinea neglecta Winchell and Many, Mem. Boston Soc. Nat. Hist., 1, 1865, pp. 96, 108.

Pterinea (*Ambonychia*) *neglecta* McChesney, Plates Illust. New Sp. Fossils, 1865, pl. 9, figs. 2–2b.

Leptodomus neglectus Whitfield, Geol. Wisconsin, 4, 1882, p. 292, pl. 18, figs. 3, 4.

Amphicella neglecta—Continued.

Amphicella neglecta McChesney, Trans. Chicago Acad. Sci., 1, 1868, p. 41, pl. 9, fig. 2.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 358, pl. 5, fig. 9a, b.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 66 (loc. occ.).—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 449, pl. 10, fig. 10.

Niagara: Bridgeport, Illinois; Milwaukee, Wisconsin (Racine); Wabash, Indiana; Ontario (Guelph).

Amphicella orbiculoides (Grabau).

Avicula? orbiculata Hall (not Hall, 1843) Pal. New York, 2, 1852, p. 284, pl. 59, fig. 4.

Lyriopecten orbiculoides Grabau, Bull. New York State Mus., 45, 1901, p. 208; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 208.

Amphicella orbiculata Whitfield and Hovey, Bull. Amer. Mus. Nat. Hist., 11, pt. 2, 1899, p. 156 (gen. ref.).

Clinton (Rochester): Rochester, Niagara, etc., New York.

Amphicella ulrichi Maynard.

Amphicella ulrichi Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 453, pl. 75, figs. 8–10.

Helderbergian (Keyser): Keyser, West Virginia.

Amphidesma delafieldi Castelnau.

Not recognized.

Amphidesma delafieldi Castelnau, Sil. Syst., 1843, p. 44, pl. 14, fig. 10.

Ordovician or Silurian: New York.

AMPHIGRAPTUS Lapworth.

Genotype: Graptolithus divergens Hall.

Amphigraptus Lapworth, Geol. Mag., 10, 1873, p. 559.—Zittel, Handb. Pal., 1, 1879, p. 298.—Tullberg, Sveriges Geol. Unders., Ser. C, No. 55, 1883, p. 12.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, No. 4, 1896, p. 266.—Koken, Die Leitfossilien, Leipzig, 1896, p. 328.—Roemer and Frech, Leth. geog., 1 Theil. Leth. Pal., 1, 3 Lief., 1897, p. 587.—Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. 121.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 270.

Amphigraptus divergens (Hall).

Graptolithus divergens Hall, Pal. New York, 3, 1859, p. 509, fig. 9; 12th Ann. Rep. New York State Cab. Nat. Hist., 1859, p. 57, fig. 9.—Canadian Org. Rem., Geol. Surv. Canada, dec. 2, 1865, p. 13, fig. 11.—Walcott, Trans. Albany Inst., 10, 1883, p. 35 (Adv. sheets 1879).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 264, fig.

Graptolithus (Coenograptus) divergens Hall, 20th Ann. Rep., New York State Cab. Nat. Hist., 1868, p. 179, fig. 12; p. 226; rev. ed., 1868, p. 210, fig. 12; p. 223.

Coenograptus (?Pleurograptus, ? Pterograptus) divergens, Roemer and Frech, Leth. geog., Leth. Pal., 1, 1897, p. 587.

Amphigraptus divergens Lapworth, Geol. Mag., 10, 1873, p. 559; Cat. West Scot. Foss., 1876, p. 5, pl. 1, fig. 70; Quart. Jour. Geol. Soc. London, 34, 1878, p. 331; Ann. Mag. Nat. Hist., 6, 1880, p. 18; Trans. Royal Soc. Canada, 5, sec. 4, 1886, p. 184.—Walcott, Bull. Geol. Soc. Amer., 1, 1890, p. 338.—Elles and Wood, Mon. British Grapt., pt. 3, 1903, p. 122, fig. 73, pl. 18, fig. 1.—Ruedemann Mem. New York State Mus., 11, pt. 2, 1908, pp. 271–272, figs. 187–190, pl. 15, figs. 2, 3.

Chazyan: Kenwood and Glenmont, New York (Normanskill); England and Scotland (Hartfell).

Amphigraptus multifasciatus (Hall).

Graptolithus multifasciatus Hall, Pal. New York, 3, 1859, suppl., pp. 508, 509, fig. 8; 12th Ann. Rep. New York State Cab. Nat. Hist., 1859, pp. 56, 57, fig. 8; Can. Org. Rem., Geol. Surv. Canada, dec. 2, 1865, p. 10, fig. 7.—Walcott, Trans. Albany Inst., 10, 1883, p. 35 (Adv. sheets, 1879).—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 266, fig.

Graptolithus (Monopirion) *multifasciatus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 176, fig. 8, p. 226; rev. ed., 1870, p. 208, fig. 8; p. 223.

Clematograptus multibrachiatus Lapworth, Ann. Mag. Nat. Hist., 6, 1890, p. 20.

Clematograptus multifasciatus Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 652 (gen. ref.).—Lapworth, Proc. and Trans. Royal Soc. Canada, 4, 1887, p. 178.—Walcott, Bull. Geol. Soc. Amer. 1, 1890, p. 338.

Amphigraptus multifasciatus Elles and Wood, Mon. Brit. Graptolites, Pal. Soc., 1903, p. xlii (gen. ref.).—Ruedemann Mem. New York State Mus., 11, pt. 2, 1908, pp. 272–274, pl. 15, fig. 4.

Chazy (Normanskill): Kenwood, near Albany, New York; Canada.

AMPHILICHAS Raymond.

Genotype: *Platymetopus lineatus* Angelin.

Platymetopus Angelin, Pal. Scand., 1854, p. 68; 3d ed., 1878, p. 68.—Nieszkowski, Archiv. f. Naturk. Liv-, Ebst-u. Kurl., (1), 1, 1857, p. 621.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 33, 1885, pp. 5, 29, 39, 49.—Zittel, Handb. Pal., 2, 1885, p. 623.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 753.—Koken, Die Leitfossilien, Leipzig, 1896, p. 30.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, p. 67.—Gurich, Neues Jahrb. f. Min., Geol. Pal. Beilage-Band, 14, 1901, p. 524, pl. 20, fig. 19.—Reed, Quart. Jour. Geol. Soc. London, 58, 1902, pp. 62, 63, 81.—Raymond, Amer. Jour. Sci., 4th ser., 19, 1905, p. 377.

Paralichas Reed (new name for *Platymetopus*, preoccupied), Quart. Jour. Geol. Soc. London, 58, sec. F, 1902, p. 80–82.

Amphilichas Raymond, Amer. Jour. Sci., 4th ser., 19, 1905, p. 378 (to replace the preoccupied names *Platymetopus* and *Paralichas*).—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 308.—Slocum, Field Mus. Nat. Hist., Geol. Ser. 4, No. 3, 1913, p. 58.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 721

Amphilichas bicornis (Ulrich).

Lichas (Hoplolichas) *bicornis* Ulrich, Amer. Geol., 10, 1892, p. 272, fig. 2a, o.

Lichas (*Platymetopus*) *bicornis* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 748, figs. 70, 71.

Richmond (Maquoketa): Spring Valley, Minnesota.

Holotype.—Cat. No. 41949. U.S.N.M.

Amphilichas clermontensis Slocum.

Amphilichas clermontensis Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, No. 3, 1913, p. 59, pl. 15, fig. 7.

Richmond (Maquoketa): Clermont, Iowa

Amphilichas cucullus (Meek and Worthen).

Lichas cucullus Meek and Worthen, Proc. Acad. Nat. Sci., Philadelphia, 1865, p. 266; Geol. Surv. Illinois, 3, 1868, p. 299.

Lichas (*Platymetopus*) *cucullus* Clarke, Geol. Minnesota, 3, 1894, p. 746, figs. 66, 67.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 236.

Black River: Alexander County, Illinois (Kimmiswick); Janesville, Wisconsin; Lake Winnipeg, Canada.

Trenton (Prosser): Wykoff, Minnesota.

***Amphilichas halli* (Foerste).**

Platynotus trentonensis (part) Hall, Pal. New York, 1, 1847, p. 235, pl. 64, fig. 1e (not 1a-d).

Lichas trentonensis Miller, N. A. Geol. Pal., 1889, p. 555, fig. 1026.

Lichas halli Foerste, Bull. Ser. Lab. Denison Univ., 3, 1888, p. 118, pl. 13, fig. 4.—

Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 754.

Lichas faberi Miller, N. A. Geol. Pal., 1889, p. 554, fig. 1024.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

Cotype.—Cat. No. 43038, U.S.N.M.

***Amphilichas jukesii* (Billings).**

Lichas Jukesii Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, pp. 282, fig. 269a, b; 335, figs. 323a, b.

Lichas (Platymetopus) jukesii Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 33, 1885, p. 29.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 753.

Chazy (Quebec P.): Cow Head, Newfoundland; Stanbridge, Quebec.

***Amphilichas minganensis* (Billings).**

Lichas Minganensis Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 181, fig. 163a, b.

Lichas (Platymetopus) minganensis Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 753.

Platymetopus minganensis Raymond, Ann. Carnegie Mus., 3, 1905, p. 355, pl. 14, figs. 1-3; p. 366, figs. 7, 8.

Amphilichas minganensis Raymond, 7th Rep. State Geol. Vermont, 1910, p. 232, pl. 38, figs. 1-3, pl. 38, fig. 6, pl. 39, fig. 14; Ann. Carnegie Mus., 7, No. 1, 1910, p. 72, pl. 18, fig. 6, pl. 19, figs. 13, 14.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 308, fig. 1619.—Baesler, Bull. Virginia Geol. Surv., 2, A, 1909, p. 111, figs. 7, 8, 10.—Perkins, Rep. State Geol. Vermont, 8, 1912, pl. 18, fig. 6.

Lichas Champlainensis Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1881, p. 342, pl. 33, figs. 6-8.—Brainerd and Seely, Bull. Amer. Mus. Nat. Hist., 3, 1890, p. 22.

Chazy: Large Island, Mingan Islands, and Montreal, Canada; Chazy, Valcour Island, etc., New York, Isle la Motte, Vermont (Day Point, Valcour); Lexington, Virginia (Liberty Hall).

***Amphilichas rhinoceros* Slocum.**

Amphilichas rhinoceros Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, No. 3, 1913, p. 58, pl. 15, figs. 5-6.

Richmond (Maquoketa): Elgin, Iowa.

***Amphilichas robbinsi* (Ulrich).**

Lichas (Hoploichas) robbinsi Ulrich, Amer. Geol., 10, 1892, p. 271, fig. 1a, b.

Lichas (Platymetopus) robbinsi Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 747, figs. 68, 69.

Trenton (Prosser): Near Wykoff, Minnesota.

Holotype.—Cat. No. 41950, U.S.N.M.

***Amphilichas trentonensis* (Conrad).**

Asaphus? trentonensis Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 277, pl. 16, fig. 16.

Platynotus trentonensis Hall, Pal. New York, 1, 1847, p. 235, pl. 64, figs. 1a-d.

Lichas trentonensis Emmons, Amer. Geol., 1, pt. 2, 1855, pl. 15, figs. 2, 5, 18.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 127.—Rowley, Missouri Bur. Geol. Mines, 2d ser., 8, 1908, p. 58, pl. 15, figs. 4, 5.

Amphilichas trentonensis—Continued.

Lichas (*Platymetopus*) *trentonensis* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 753, (gen. ref.).

Platymetopus trentonensis Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 200, pl. 15, figs. 17-19.

Amphilichas trentonensis Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 308.

Trenton: Near Carlisle, Pennsylvania; Middleville. etc., New York; Jacksonburg, New Jersey; Frankfort, Missouri.

AMPHION CAYLEYI Billings. See *Anacheirus? apollo*.

AMPHION MULTISEGMENTATUS Portlock. See *Encrinurus multisegmentatus*.

AMPHISTROPHIA Hall and Clarke. See *Strophonella* Hall.

AMPHOTON Lorenz. See *Dolichometopus Angelin*.

AMPLEXOPORA Ulrich.

Genotype: *A. cingulata* Ulrich.

Amplexopora Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 154.—Foord, Contr. Micro-Pal. Cambro.-Sil., 1883, p. 15.—Miller, N. A. Geol. Pal., 1889, p. 291.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 377, 450.—Ulrich, Zittel-Eastman Textb. Pal., 1896, p. 278.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 577.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 30.—Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 41.—Grabau and Shimer, N. A. Index Fossils, 1, 1904, p. 130.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 739.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 336.

AMPLEXOPORA AFFINIS Ulrich. See *Heterotrypa affinis*.

Amplexopora ampla Ulrich and Bassler.

Amplexopora ampla Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 42, pl. 13, figs. 7, 8; pl. 14, fig. 3.

Maysville: Nashville and Columbia, Tennessee (Leipers); Cincinnati, Ohio (Fairmount).

Cotypes.—Cat. No. 42313, U.S.N.M.

AMPLEXOPORA CANADENSIS Foord. See *Batostoma canadense*.

Amplexopora cingulata Ulrich.

Amplexopora cingulata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 254, pl. 11, figs. 5-5c.—Miller, N. A. Geol. Pal., 1889, fig. 449 (p. 292).—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 308, fig. 3c; p. 309, fig. 4c.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 193.—Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 55, pl. 3, fig. 6.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 131, fig. 186g.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 758, pl. 6, figs. 1, 1a; pl. 26, fig. 3.

Maysville (Fairmount): McKinneys Station and Boyle County, Kentucky; Cincinnati, Ohio.

Cotypes.—Cat. No. 43641, U.S.N.M.

Amplexopora columbiana Ulrich and Bassler.

Amplexopora columbiana Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 41, pl. 13, figs. 1-4.—Hayes and Ulrich, Folio U. S. Geol. Surv., 95, 1903, illustration sheet, figs. 11, 12.

Maysville (Leipers): Columbia, etc., Tennessee.

Cotypes.—Cat. No. 43211, U.S.N.M.

***Amplexopora cylindracea* Ulrich and Bassler.**

Amplexopora cylindracea Ulrich and Bassler, *Smiths. Misc. Coll.*, 47, 1904, p. 43, pl. 13, figs. 5, 6; pl. 14, figs. 4, 5.

Trenton (Catheys): Nashville, Tennessee.

Cotypes.—Cat. No. 43216, U.S.N.M.

***Amplexopora? discoidea* (Nicholson).**

Chaetetes discoideus James, *Cat. Foss. Cincinnati group*, 1871 (not defined).—Nicholson, *Quart. Jour. Geol. Soc. London*, 30, 1874, p. 511, pl. 30, figs. 4-4d; *Pal. Ohio*, 2, 1875, p. 206, pl. 21, figs. 15-15c; *Pal. Prov. Ontario*, 1875, pp. 10, 32; *Ann. Mag. Nat. Hist.*, 4th ser., 18, 1876, p. 88, pl. 5, figs. 7, 7a.

Chaetetes (*Monticulipora*) *discoideus* Chamberlin, *Geol. Wisconsin*, 1, 1883, p. 153, fig.

Monticulipora (*Monotrypa*) *discoidea* Nicholson, *Genus Monticulipora*, 1881, p. 193, pl. 4, figs. 3, 3f.

Amplexopora discoidea Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 255.—Foord, *Contr. Micro-Pal. Cambro-Sil.*, 1883, p. 17.—Bassler, *Proc. U. S. Nat. Mus.*, 30, 1906, p. 11.

Leptotrypa discoidea Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 6, 1883, p. 158.—Cumings, 32d *Ann. Rep. Dep. Geol. Nat. Hist. Res. Indiana*, 1908, p. 855, pl. 20, figs. 2-2f.

Monticulipora discoidea Hall, 12th *Ann. Rep. Indiana Geol. Nat. Hist.*, 1883, p. 247, pl. 10, figs. 4, 5.—James and James, *Jour. Cincinnati Soc. Nat. Hist.*, 10, 1888, p. 163.—Lesley, *Geol. Surv. Pennsylvania, Rep. P 4*, 1889, p. 420, figs.—James, J. F., *Jour. Cincinnati Soc. Nat. Hist.*, 16, 1894, p. 178.

Maysville: Cincinnati, Ohio, and vicinity (Fairmount); Ontario (Pulaski).

***Amplexopora filiosa* (D'Orbigny).**

Monticulipora filiosa D'Orbigny, *Prodr. de Pal.*, 1, 1850, p. 25.—Milne-Edwards, *Hist. nat. des Corall.*, 3, 1860, p. 274.—James and James, *Jour. Cincinnati Soc. Nat. Hist.*, 10, 1888, p. 162.—J. F. James, *ibid.*, 15, 1893, p. 158.

Chaetetes filiosa Milne-Edwards and Haime, *Pol. Foss. Ter. Pal.*, 1851, p. 261.—Nicholson, *Pal. Ohio*, 2, 1875, p. 206.

Leptotrypa filiosa Ulrich, *Geol. Surv. Illinois*, 8, 1890, p. 456, pl. 36, figs. 7, 7a.

Monotrypa? filiosa Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 10, 1883, p. 162.

Amplexopora filiosa Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 164.—Ulrich and Bassler, *Smiths. Misc. Coll.*, 47, 1904, p. 41, pl. 12, figs. 10, 11.—Bassler, *Proc. U. S. Nat. Mus.*, 30, 1906, p. 12, pl. 3, figs. 1-3.—Cumings, 32d *Ann. Rep. Dep. Geol. Nat. Hist. Res. Indiana*, 1908, p. 765, pl. 5, fig. 2; pl. 7, figs. 1, 1b.

Monticulipora subcylindrica James, *Jour. Cincinnati Soc. Nat. Hist.*, 18, 1896, p. 123, fig. 13a-c.

Maysville (Fairmount-Corryville): Cincinnati, Ohio, and various localities in Ohio, Indiana, Kentucky, Tennessee, etc.

Plesiotypes.—Cat. No. 44070, U.S.N.M.

***Amplexopora granulosa* Cumings and Galloway.**

Amplexopora granulosa Cumings and Galloway, 37th *Ann. Rep. Dep. Geol. Nat. Res. Indiana*, 1913, p. 69, pl. 1, figs. 1-1c.

Richmond (Liberty): Near Weisburg, Indiana.

AMPLEXOPORA MULTISPINOSA Cumings. See *Amplexopora septosa*.

***Amplexopora persimilis* Nickles.**

Amplexopora persimilis Nickles, *Bull. Kentucky Geol. Surv.*, 5, 1905, p. 47, pl. 2, figs. 2, 3.

Eden (Economy): Cincinnati, Ohio, and vicinity.

***Amplexopora petasiformis* (Nicholson).**

Chaetetes petropolitanus James, *Paleontologist*, No. 2, 1878, p. 11.—Bassler, *Proc. U. S. Nat. Mus.*, 30, 1906, p. 31.

Monticulipora (Monotrypa) *petasiformis* Nicholson, *Genus Monticulipora*, 1881, p. 190, fig. 40.

Monotrypa petasiformis Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 256; 6, 1883, p. 163.

Monticulipora petasiformis James and James, *Jour. Cincinnati Soc. Nat. Hist.*, 10, 1888, p. 168.—J. F. James, *ibid.*, 16, 1894, p. 186.

Amplexopora petasiformis Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 165.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 760, pl. 6, figs. 3, 3a; pl. 26, fig. 2.

Eden (Economy-McMicken): Cincinnati, Ohio, and vicinity.

***Amplexopora petasiformis welchi* (James).**

Monticulipora (Monotrypa) *welchi* James, *Paleontologist*, No. 6, 1882, p. 50; No. 7, 1883, pl. 1, figs. 4-4c.

Monticulipora petasiformis var. *welchi* James and James, *Jour. Cincinnati Soc. Nat. Hist.*, 10, 1888, p. 169.—J. F. James, *ibid.*, 16, 1894, p. 187.

Amplexopora petasiformis-welchi Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 165.—Bassler, *Proc. U. S. Nat. Mus.*, 30, 1906, p. 13.

Eden (Economy-McMicken): Cincinnati, Ohio, and vicinity.

***Amplexopora pumila* Cumings and Galloway.**

Amplexopora pumila Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 70, pl. 2, figs. 1-1e.

Richmond (Waynesville and Liberty): Near Weisburg, Indiana.

***Amplexopora pustulosa* Ulrich.**

Amplexopora pustulosa Ulrich, *Geol. Surv. Illinois*, 8, 1890, p. 451, pl. 36, figs. 3-3c.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 761, pl. 6, figs. 4-4b; pl. 26, fig. 1.

Monticulipora pustulosa J. F. James, *Jour. Cincinnati Soc. Nat. Hist.*, 18, 1896, p. 72.

Richmond (Waynesville): Hanover, Clarksville, etc., Ohio; Indiana.

Cotype.—Cat. No. 44069 U.S.N.M.

***Amplexopora robusta* Ulrich.**

Amplexopora robusta Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 6, 1883, p. 82, pl. 1, figs. 1-1b.—Miller, *N. A. Geol. Pal.*, 1889, p. 292, fig. 450.—Ulrich, *Geol. Surv. Illinois*, 8, 1890, p. 318, fig. 7d.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 762, pl. 6, figs. 5, 5b.

Maysville (Bellevue): Cincinnati, Ohio, and vicinity; Indiana; Kentucky.

Holotype.—Cat. No. 43640 U.S.N.M.

***Amplexopora septosa* (Ulrich).**

Atactopora septosa Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 2, 1879, p. 125, pl. 12, figs. 7-7c.

Monticulipora septosa James and James, *Jour. Cincinnati Soc. Nat. Hist.*, 10, 1888, p. 180.—James, J. F., *ibid.*, 16, 1894, p. 203.

Amplexopora septosa Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 255.—Nickles, *Bull. Kentucky Geol. Surv.*, 5, 1905, p. 52, pl. 3, fig. 1.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 763, pl. 6, figs. 6, 6b; pl. 26, fig. 4.

Amplexopora multispinosa Cumings, *Amer. Geol.*, 23, 1901, p. 376, pl. 34, figs. 7-10.

Amplexopora septosa—Continued.

Amplexopora septosa var. *multispinosa* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 765, pl. 6, figs. 2, 2b; pl. 26, fig. 5.

Amplexopora septosa maculosa Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 71, pl. 3, figs. 1-1c.

Amplexopora septosa minima Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 72, pl. 4, figs. 1-1d.

Eden (McMicken) and Maysville (Mt. Hope and Fairmount): Cincinnati, Ohio, and vicinity; Indiana and Kentucky.

Cotypes.—Cat. No. 43621 U.S.N.M.

AMPLEXOPORA SEPTOSA MACULOSA Cumings and Galloway. See *Amplexopora septosa*.

AMPLEXOPORA SEPTOSA MINIMA Cumings and Galloway. See *Amplexopora septosa*.

AMPLEXOPORA SEPTOSA MULTISPINOSA Cumings. See *Amplexopora septosa*.

AMPLEXOPORA SUPERBA Foord. See *Batostoma superbum* and *B. minnesotense*.

AMPLEXOPORA WINCHELLI Ulrich. See *Batostoma winchelli*.

AMPLEXUS Sowerby.

Genotype: *A. coralloides* Sowerby.

Amplexus Sowerby, Min. Conch., 1, 1814, p. 165.—Phillips, Pal. Foss. Cornwall, Devon and W. Somerset, 1841, p. 7.—McCoy, Syn. Char. Carb. Foss. Ireland, 1844, p. 185.—Koninck, Desc. Animaux Fossiles, Leige, 1842, p. 26.—Dana, Wilkes' U. S. Expl. Exped. 1838-42, 7, Zoophytes, 1846, p. 357; Amer. Jour. Sci. Arts, 2d ser., 1, 1846, p. 184.—Edwards and Haime, Mon. d. Polyp. Foss. d. Terr., Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), pp. 164, 342.—McCoy, British Pal. Rocks Foss., 1854, p. 70.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 452.—Billings, Canadian Jour. n. s., 4, 1859, p. 123.—Milne-Edwards Hist. Nat. d. Corall., 3, 1860, p. 347.—Koninck, Animaux Foss. Terr. Carb. Belgique (Mem. l'Acad. Royal Sci. de Belgique, 39), 1872, p. 63.—Dybowski, Archiv. f. Natur. Liv-Ebst-und Kurl., 5, 1873, p. 334.—Nicholson, Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 31.—Thomson and Nicholson, Ann. Mag. Nat. Hist., 4th ser., 16, 1875, p. 424.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 153.—Zittel, Handb. Pal., 1, 1879, p. 227.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 364.—Frech, Zeits. d. geol. Gesell., 37, 1885, p. 83.—Frech, in Dames & Kayser, Pal. Abhandl., 3, Heft 3, 1886, p. 97.—Miller, N. A. Geol. Pal., 1889, p. 171; 2d App., 1897, p. 726.—Sherzer, Amer. Geol., 7, 1891, pp. 278-283.—Koken, Die Leitfossilien, Leipzig, 1896, p. 313.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 123.—Zittel-Eastman Textb. Pal., 1, 1900, p. 76.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 128.—Pocta, Syst. Sil. du Centre Boheme, 8, pt. 2, 1902, p. 76.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 58.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 83.

AMPLEXUS ANNULATUS Whitfield. See *Amplexus whitfieldi*.

Amplexus cinctus Miller.

Amplexus cinctus Miller, 18th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1893, p. 259, pl. 1, figs. 5, 6. (Adv. sheets, 1892, p. 5.)

Niagaran (Laurel): St. Paul, Indiana.

Amplexus cingulatus Billings.

Amplexus cingulatus Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 106. (Adv. sheets, 1862.)—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 129, pl. 10, figs. 2, 3, 3a.

Silurian: L'Anse a la Barbe, Bay of Chaleurs, Quebec.

Amplexus felldeni Etheridge.

Amplexus Felldeni Etheridge, *Quart. Jour. Geol. Soc. London*, 34, 1878, p. 589, pl. 26, fig. 3.

Niagaran: Offley Island, Arctic America.

Amplexus fenestratus Whitfield.

Amplexus fenestratus Whitfield, *Ann. Rep. for 1877, Wisconsin Geol. Surv.*, 1878, p. 80; *Geol. Wisconsin*, 4, 1882, p. 278, pl. 15, figs. 1-3.

Niagaran (Waukesha-Racine): Cato, Cato Falls, and near Clarks Mills, Wisconsin.

Amplexus junctus Hall.

Amplexus junctum Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 415 (ext. 1882, p. 11).

Niagaran: Port Byron, Illinois.

AMPLEXUS LAXATUS Billings. See *Pycnostylus guelphensis*.**Amplexus phragmoceras** (Salter).

Calophyllum Phragmoceras Salter, *Sutherland's Jour. Voyage in Baffin's Bay*, etc., 2, 1852, p. ccxxx, pl. 6, figs. 4, 4a.—Houghton, *Jour. Geol. Soc. Dublin*, 1, 1857, p. 245, pl. 8, fig. 1.—Etheridge, *Quart. Jour. Geol. Soc. London*, 34, 1878, p. 585.

Amplexus phragmoceras Miller, *N. A. Geol. Pal.*, 1889, p. 171 (gen. ref.).

Niagaran: Seal Island, Baring Bay, and Cape Hilgard, Arctic America.

Amplexus septatus Foerste.

Amplexus septatus Foerste, *Jour. Cincinnati Soc. Nat. Hist.*, 21, No. 1, 1909, p. 8, pl. 1, figs. 12a, b; pl. 2, figs. 16 a-c.

Cayugan (Kokomo): Near Kokomo, Indiana.

Amplexus shumardi (Edwards and Haime).

Cyathophyllum Shumardi Milne-Edwards and Haime, *Hist. Nat. Corall.*, 3, 1860, p. 372; *Mon. Polyp. Foss. Terr. Pal. (Arch. du Mus. d'Hist. Nat.)*, 5, 1851, p. 370, pl. 7, fig. 3.—Roemer, *Sil. Fauna West Tennessee*, 1860, p. 27, pl. 2, figs. 14, 14a.

Amplexus shumardi Rominger, *Geol. Surv. Michigan*, 3, pt. 2, 1876, p. 153, pl. 54.—Davis, *Kentucky Fossil Corals*, *Geol. Surv. Kentucky*, pt. 2, 1885, pl. 132, fig. 14; pl. 138, fig. 3.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1889, p. 24, fig.—Foerste, *Jour. Geol.*, 11, 1903, p. 712.—Grabau and Shimer, *N. A. Index Fossils* 1, 1906, p. 59.

Zaphrentis cinctosa Billings, *Cat. Sil. Foss. Anticosti*, *Geol. Surv. Canada*, 1866, p. 92.

Zaphrentis shumardi Lambe, *Cont. Can. Pal.*, *Geol. Surv. Canada*, 4, pt. 2, 1901, p. 121, pl. 8, figs. 3, 4.

Niagaran: Perry County, etc. Tennessee (Brownsport): Masonville, Iowa; Drummond Island, Point Detour, Cockburn Island, etc., Lake Huron; Louisville, Kentucky; Wisconsin, etc.

Amplexus uniformis Hall.

Amplexus uniforme Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 415 (ext. 1882, p. 11).

Niagaran: Port Byron, Illinois.

Amplexus whitfieldi Miller.

Amplexus annulatus Whitfield (not Verneuil and Haime, 1850), *Ann. Rept. for 1877, Wis. Geol. Surv.*, 1878, p. 80; *Geol. Wisconsin*, 4, 1882, p. 314, pl. 23, figs. 8-11.

Amplexus whitfieldi Miller, *N. A. Geol. Pal.*, 2d App., 1897, p. 726.

Niagaran (Guelph): Sheboygan and Carlton, Wisconsin.

AMPYX Dalman.Genotype: *Ampyx nasutus* Dalman.

Ampyx Dalman, *Svenska Vet.-Akad. Handl.* for 1826, 1827, pp. 252, 279.—Dalman-Engelhart, *Die Palæaden*, Nuremberg, 1828, pp. 53, 72.—Eichwald, *Zool. Specialis*, Pt. 2, Vilnæ, 1830, p. 116.—Green, *Mon. Tril. N. A.*, 1832, p. 19.—Edwards, *Hist. Nat. d. Crustacees*, 3, 1840, p. 296.—Portlock, *Rep. Geol. Londonderry*, 1843, p. 258.—Burmeister, *Org. der Tril.*, Berlin, 1843, p. 128.—Goldfuss, *Neues Jahrb. f. Min., etc.*, 1843, p. 540, 542.—Emmrich, *Neues Jahrb. f. Min., etc.*, 1845, p. 45.—Burmeister, *Org. Tril.*, London, 1846, p. 110.—Hawle and Corda, *Abh. d. k. Bohmischen Gesell. d. Wiss.*, 5 (extract), 1847, p. 38, pl. 3, fig. 19.—Forbes, *Mem. Geol. Surv. United Kingdom*, Dec. 2, 1849, pl. 10.—Barrande, *Neues Jahrb. f. Min., etc.*, 1850, p. 780; *Syst. Sil. du Centre Boheme*, 1, 1852, p. 632.—McCoy, *British Pal. Rocks Fossils*, 1854, p. 147.—Pictet, *Traite Pal.*, 2d ed., 2, 1854, p. 509.—Malaise, *Desc. Terr. Sil. du Centre de la Belgique*, 1873, p. 84.—Steinhardt, *Beit. z. Naturk. Preus. Phys.-Oekon. Gesell.*, Königsberg, 1874, p. 38.—Angelin, *Pal. Scandinavica*, 3d ed., Holmiæ, 1878, p. 19.—Nicholson and Etheridge, *Mon. Sil. Foss. Girvan Dist.*, 1880, p. 176.—Zittel, *Handb. Pal.*, 2, 1885, p. 594.—Miller, *N. A. Geol. Pal.*, 1889, p. 528.—Pompeckj, *Beit. Phys.-Oekon. Gesell. Königsberg*, 1890, p. 16.—Vogdes, *Amer. Geol.* 11, 1893, pp. 99-106.—Schmidt, *Mem. l'Acad. Imp. Sci. St. Petersburg*, 7, ser., 42, 1894, p. 74.—Beecher, *Amer. Jour. Sci.*, 3d ser., 49, 1895, p. 307.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 15, fig. 8.—Beecher, *Amer. Jour. Sci.*, 4th ser., 3, 1897, pp. 105, 184, 186, pl. 3, fig. 13.—Frech, *Leth. geog.* 1, Th., *Leth. Pal.*, 2, 1897, p. 32, footnote.—Ruedemann, *Bull. New York State Mus.*, 49, 1901, p. 51.—Lindstrom, *Kongl. Sven. Vet.-Akad. Handl.*, 34, No. 8, 1901, p. 32.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 259.—Raymond, *Zittel-Eastman Textb. Pal.*, 1913, p. 712.

Lonchodomas Angelin, *Pal. Scandinavica*, 3d ed., Holmiæ, 1878, p. 80, pl. 40, fig. 11.—Nicholson and Etheridge, *Mon. Sil. Foss. Girvan Dist.*, 1880, p. 177.—Zittel, *Handb. Pal.*, 2, 1885, p. 594.—Pompeckj, *Beit. Phys.-Oekon. Gesell. Königsberg*, 1890, p. 16.—Vogdes, *Amer. Geol.*, 11, 1893, p. 103.—Schmidt, *Mem. l'Acad. Imp. Sci. St. Petersburg*, 7th ser., 62, 1894, p. 75.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 15.—Ruedemann, *Bull. New York State Mus.*, 49, 1902, p. 51.—Raymond, *Zittel-Eastman Textb. Pal.*, 1913, p. 712 (Genotype: *Ampyx rostratus* Sars).

***Ampyx americanus* Safford and Vogdes.**

Ampyx Americanus Safford and Vogdes, *Proc. Acad. Nat. Sci. Philadelphia*, 1889, p. 166, fig.—Vogdes, *Amer. Geol.*, 11, 1893, p. 106, fig. 4.

Ampyx jillsoni Safford, *Geol. Tennessee*, 1869, p. 235 (nom. nud.).

Chazy (Athens): Bulls Gap, near Russellville, Tennessee.

***Ampyx (Lonchodomas) halli* (Billings).**

Ampyx halli Billings, *Rep. Econ. Geol., etc.*, Vermont, 1862, p. 231, fig. 365; *Geol. Vt.*, 2, 1862, p. 959, fig. 365; *Geol. Canada*, *Geol. Surv. Canada*, 1863, p. 274, fig. 279a-c; *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 24, text figs. 25a-c (Adv. sheets, 1861).—Vogdes, *Amer. Geol.*, 11, 1893, p. 106, fig. 5.

Ampyx (Lonchodomas) halli Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 259, figs. 1548, 1549.

Lonchodomas halli Raymond, *Ann. Carnegie Mus.*, 3, No. 2, 1905, p. 332, pl. 10, figs. 3-7; 7th Rep. State Geol. Vermont, 1910, p. 216, pl. 32, figs. 3-6.

Chazy: St. Dominique, Canada; Highgate, Vermont; Valcour, etc., New York (Crown Point).

Ampyx (Lonchodomas) hastatus Ruedemann.

Ampyx (Lonchodomas) hastatus Ruedemann, Bull. New York State Mus., 49, 1902, p. 48, pl. 3, figs. 1-10, 30.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

AMPYX JILLSONI Safford. See *Ampyx americanus*.

Ampyx (Lonchodomas) læviusculus (Billings).

Ampyx læviusculus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 295, fig. 285.

Chazyan (Quebec-N): Table Head, Newfoundland.

Ampyx niagarensis Van Ingen.

Ampyx niagarensis Van Ingen, School of Mines Quart., 23, 1901, p. 53, fig. 15, pl. figs. 11, 11a.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 259, fig. 1550.

Niagaran (St. Clair): St. Clair Spring, Independence County, Arkansas.

Ampyx (Lonchodomas) normalis (Billings).

Ampyx normalis Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 295, fig. 286.—Miller, N. A. Geol. Pal., 1889, p. 528, fig. 958.—Vogdes, Amer. Geol., 11, 1893, p. 107, fig. 6.

Ampyx (Lonchodomas) normalis Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 259.

Chazyan (Quebec-N, P.): Table Head and Pistolet Bay and four miles northeast of Portland Creek, Newfoundland.

Ampyx quadricostatus (Emmons).

Microdiscus quadricostatus Emmons, Amer. Geology, 1, pt. 2, 1855, p. 116, pl. 1, fig. 8; Man. Geol., 1860, p. 88, fig. 73.—Barrande, Bull. Soc. Geol. France, 2d ser., 18, 1861, p. 280, pl. 5, fig. 13.—Marcou, Mem. Boston Soc. Nat. Hist., 4, 1888, p. 128.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 405, fig.—Miller, N. A. Geol. Pal., 1889, p. 557, fig. 1033.

Chazyan (Athens): Augusta County, Virginia.

Ampyx (Lonchodomas) rutilius (Billings).

Ampyx rutilius Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 296.—Vogdes, Amer. Geol., 11, 1893, p. 108.

Chazyan (Quebec-P.): Four miles northeast of Portland Creek, Newfoundland.

Ampyx (Lonchodomas) semicostatus (Billings).

Ampyx semicostatus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 297, fig. 287.—Vogdes, Amer. Geol., 11, 1893, p. 108, fig. 6.

Chazyan (Quebec-N, P.): Table Head, Pistolet Bay, and four miles northeast of Portland Creek, Newfoundland.

AMYGDALOCYSTIS Haeckel. See *Amygdalocystites* Billings.

AMYGDALOCYSTITES Billings.

Genotype: *A. florealis* Billings.

Amygdalocystites Billings, Canadian Jour., 2, 1854, p. 270; Geol. Surv. Canada, Rep. for 1853-1857, 1857, p. 288; Geol. Surv. Canada, dec. 3, 1858, p. 63.—Chapman, Expos. Min. and Geol. Canada, 1864, p. 109.—Zittel, Handb. Pal., 1, 1879, p. 413.—Billings, Trans. Ottawa Field Nat. Club, 1, No. 4, 1883, p. 51.—Miller, N. A. Geol. Pal., 1889, p. 223.—Jaekel, Zeits. d. d. geol. Gesell., 52, 1900, p. 675.—Zittel, Grundzuge Pal., 1, 1910, p. 184.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 462.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 151.

Amygdalocystis Haeckel, Amphor. und Cystoid., 1896, p. 106.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 58, fig. 29.

Amygdalocystites florealis Billings.

Amygdalocystites florealis Billings, Canadian Jour., 2, 1854, p. 270, figs. 4-6; Rep. Geol. Surv. Canada, 1857, p. 289; Canadian Org. Remains, dec. 3, Geol. Surv. Canada, 1858, p. 888, 63, pl. 6, fig. 1a-e; pl. 10 bis., fig. 12.—Chamberlin Geol. Wisconsin, 1, 1883, p. 154, fig.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 463, fig. 1769.

Amygdalocystis florealis Haeckel, Amphorideen u. Cystoideen, 1896, p. 106, fig. 15.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 57, fig. 19.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 45 (loc. occ.).

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

Amygdalocystites florealis laevis Billings.

Amygdalocystites florealis var. *laevis* Billings, Trans. Ottawa Field Nat. Club, 4, 1883, p. 52.

Trenton (Curdsville): Hull, Quebec.

Amygdalocystites huntingtoni Wetherby.

Amygdalocystites huntingtoni Wetherby, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 177, pl. 5, fig. 3.—Miller, N. A. Geol. Pal., 1889, p. 223, fig. 245.

Trenton (Curdsville): Mercer County, near High Bridge, Kentucky.

Amygdalocystites radiatus Billings.

Amygdalocystites radiatus Billings, Canadian Jour., 2, 1854, p. 271, figs. 7, 8; Rep. Geol. Surv. Canada, 1857, p. 289; Canadian Org. Rem., dec. 3, Geol. Surv. Canada, 1858, p. 65, pl. 6, figs. 3a, 3b; Trans. Ottawa Field Nat. Club, 1, No. 4, 1883, p. 51.

Amygdalocystis radiatus Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 45 (loc. occ.).

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

Amygdalocystites tenuistriatus Billings.

Amygdalocystites tenuistriatus Billings, Canadian Journal, 2, 1854, p. 271, text fig. 9; Rep. Geol. Surv. Canada, 1857, p. 289; Canadian Org. Rem., dec. 3, Geol. Surv. Canada, 1858, p. 64, pl. 6, figs. 2a-f.

Trenton (Curdsville): Ottawa, Ontario.

ANABAIA Clarke.

Genotype: *A. paraia* Clarke.

Anabaia Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 12.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 417.

ANABAIA ANTICOSTIANA Clarke. See *Camarotoechia decemplicata*.

Anabaia paraia Clarke.

Anabaia paraia Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 12, pl. 2, figs. 1-9.

Silurian: Rio Trombetas, Brazil.

ANACHEIRURUS Reed.

Genotype: *Eccoptocheile frederici* Salter.

Anacheirurus Reed, Geol. Mag., dec. 4, 3, 1896, p. 119.

Anacheirurus? apollo (Billings).

Cheirurus Apollo Billings, Canadian Nat. Geol., 5, 1860, p. 322, fig. 28; Geol. Canada, Geol. Surv. Canada, 1863, p. 239, fig. 275; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 413, fig. 397.

Ceraurus (Cyrtometopus) *apollo* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 738. *Pseudosphærexochus apollo* Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 36, pl. 4, figs. 1, 2.

Anacheirurus? apollo—Continued.

Anacheirurus? apollo Raymond and Barton, Bull. Mus. Comp. Zool., 54, No. 20, 1913, p. 543 (gen. ref.).

Amphion Cayleyi Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 239, fig. 277; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 413, footnote, fig. 398.

Canadian or Ozarkian? (Levis-erratic): Point Levis, Quebec.

ANAPHRAGMA Ulrich and Bassler. Genotype: *A. mirabile* Ulrich and Bassler.

Anaphragma Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 49.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 297.

Anaphragma mirabile Ulrich and Bassler.

Anaphragma mirabile Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 49, pl. 13, figs. 9–11.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 298, 299, fig. 183.

Richmond: Wilmington, Illinois (Fernvale); Delafield and Iron Ridge, Wisconsin (Maquoketa); Island of Dago, Baltic Sea (Lyckholm).

Cotypes and *plesiotype*: Cat. Nos. 43218, 57385, U.S.N.M.

ANASTROPHIA Hall.

Genotype: *Pentamerus verneuili* Hall.

Brachymerus Shaler (not Dejean, 1834), Bull. Mus. Comp. Zool., 4, 1865, p. 69.—Zittel, Handb. Pal., 1, Munich, 1880, p. 694.—Koken, Die Leitfossilien, Leipzig, 1896, p. 244.

Anastrophia Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 163; Pal. New York, 4, 1867, p. 374.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv. 1889, p. 47.—Miller, N. A. Geol. Pal., 1889, p. 333.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 224; 13th Ann. Rep. New York State Geol., 1895, p. 839.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 321.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 189; Bull. New York State Mus., 9, 1901, p. 189.

Anastrophia brevirostris (Hall).

?*Terebratula brevirostris* Sowerby, Murchison's Sil. Syst., 1839, p. 631, pl. 13, fig. 15.

Atrypa brevirostris? Hall, Pal. New York, 2, 1852, p. 278, pl. 58, fig. 1.

Pentamerus brevirostris Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 77.

Rhynchonella brevirostris Billings, Geol. Canada, 1863, p. 315, fig. 324.—Lesley, Geol. Surv. Pennsylvania Rep. P 4, 1889, p. 884, fig.

Anastrophia brevirostris Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 142.—Grabau, Bull. New York State Mus., 45, 1901, p. 190, fig. 102; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 190, fig. 102.

Clinton (Rochester): Lockport, etc., New York.

ANASTROPHIA? HEMIPLICATA Winchell and Schuchert. See *Parastrophia hemiplicata*.**ANASTROPHIA? HEMIPLICATA** var. **ROTUNDA** Winchell and Schuchert. See *Parastrophia hemiplicata rotunda*.**Anastrophia internascens** Hall.

Anastrophia verneuili Hall (not Hall, 1859), 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1876, pl. 26, figs. 41–49.

Anastrophia internascens Hall, *ibid.*, 1879, p. 168, pl. 26, figs. 41–49; 11th Rep. State Geol. Indiana, 1882, p. 311, pl. 26, figs. 41–49.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 47, pl. 32, figs. 17–20.—Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 32, pl. 3, figs. 14–16.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 224, pl. 63, fig.

Anastrophia internascens—Continued.

- 30.—Miller, N. A. Geol. Pal., 1889, p. 333, text fig. 538.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 434, pl. 2, fig. 10.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 272, fig. 329.
- Niagaran: Waldron, Indiana, and Newsom, Tennessee (Waldron and Laurel); Louisville, Kentucky (Louisville); Wabash, Indiana; Milwaukee, Wisconsin.
- Pteriotype*.—Cat. No. 51336, U.S.N.M.

Anastrophia interplicata (Hall).

- Atrypa interplicata* Hall, Pal. New York, 2, 1852, p. 275, pl. 57, fig. 2.
- Pentamerus interplicatus* Hall, 12th Rep. New York State Cab. Nat. Hist. 1859, p. 77.—Safford, Geol. Tennessee, 1869, p. 315, fig. 7.
- Anastrophia interplicata* Miller, Amer. Pal. Fossils, 1877, p. 104.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 224.—Grabau, Bull. New York State Mus., 45, 9, 1901, p. 190, fig. 101; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 190, fig. 101.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 272, fig. 238.
- Niagaran: Lockport, etc., New York (Rochester); Louisville, Kentucky; Tennessee; Wisconsin.

ANASTROPHIA REVERSA Miller. See *Parastrophia reversa*.

ANASTROPHIA? SCOFIELDI Winchell and Schuchert. See *Parastrophia scofieldi*.

ANASTROPHIA VERNEULI Hall. See *Anastrophia internascens*.

ANATINA? SINUATA Hall. See *Ilionia sinuata*.

ANAZYGA Davidson. See *Zygospira* Hall.

ANCISTROCERAS Boll.

Genotype: *A. undulatum* Boll.

- Ancistroceras* Boll, Archiv. des Vereins der Freunde der Naturgesch. in Mecklenburg, 11, 1857, p. 87.—Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 509.—Remele, Zeits. d. d. geol. Gesell., 33, 1881, p. 184; *ibid.*, 34, 1882, p. 123.—Noetling, Jahrb. d. k. Preuss. Geol. Landesans. u. Bergak. für 1883, 1884, p. 122, 130.—Koken, Die Leitfossilien, Leipzig, 1896, p. 50.

Ancistroceras? dyeri Hyatt.

- Ancistroceras? dyeri* Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 511.
- Niagaran (Racine): Chicago, Illinois.

ANGELLUM Miller. See *Cyrtodonta* Billings.

ANISOCERINUS Angelin.

Genotype: *A. interradiatus* Angelin.

- Anisocrinus* Angelin, Icon. Crin. Suec., 1878, p. 13.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, Rev. Pal., 1, 1879, p. 37.—Zittel, Handb. d. Pal., 1, 4, 1879, p. 356.—Bather, Treatise on Zool., 3, 1900, p. 189.—Springer, Jour. Geol., 14, 1906, p. 479.

Anisocrinus greenei (Miller and Gurley).

- Lecanocrinus greenei* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 8, 1896, p. 52, pl. 3, fig. 28.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 748 fig., 1363.

Anisocrinus greenei Springer, Jour. Geol., 14, 1906, p. 480, pl. 6, fig. 11; Mon. Crin. Flex., Smiths. Inst. (in press).

Niagaran: Near Louisville, Kentucky (Louisville); Decatur County, Tennessee (Brownsport).

Anisocrinus oswegoensis (Miller and Gurley).

Lecanocrinus oswegoensis Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 4, 1894, p. 33, pl. 3, figs. 15-17.

Anisocrinus oswegoensis Springer, Jour. Geol., 14, 1906, p. 480, pl. 6, fig. 12; Mon. Crin. Flex., Smiths. Inst. (in press).

Niagaran: Oswego, Illinois.

ANISOPHYLLUM Edwards and Haime.

Genotype: *A. agassizi* Edwards and Haime.

Anisophyllum Edwards and Haime, Mon. Polyp. Foss. Ter. Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), pp. 165, 354.—Pictet, Traite Pal., 2d ed., 4, 1857, p. 453.—Milne-Edwards, Hist. Corall., 3, 1860, p. 354.—Dybowski, Archiv. Natur. Liv.-Ehst. und Kurl., 5, 1873, pp. 335, 396.—Zittel, Handb. Pal., 1, 1879, p. 229.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 370.—Miller, N. A. Geol. Pal., 1889, p. 172.—Sherzer, Amer. Geol., 7, 1891, pp. 278-285.

Anisophyllum agassizi Edwards and Haime.

Anisophyllum agassizi Edwards and Haime, Mon. Polyp. Foss. Ter. Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), p. 351, pl. 1, figs. 2, 2a.—Pictet, Traite Pal., 2d ed., 4, 1857, p. 453, pl. 107, fig. 19.—Milne-Edwards, Hist. Nat. Corall., 3, 1860, p. 355.

Niagaran (Brownsport): Perry County, Tennessee.

Anisophyllum? bilamellatum Hall.

Anisophyllum? bilamellatum Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 413 (ext. 1882, p. 9).

Niagaran (Louisville): Louisville, Kentucky.

Anisophyllum trifurcatum Hall.

Anisophyllum trifurcatum Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 413 (ext. 1882, p. 9); 12th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 273, pl. 15, figs. 7, 8.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 26, text figs.

Niagaran (Louisville): Louisville, Kentucky.

Anisophyllum unilargum Hall.

Anisophyllum unilargum Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 412 (ext. 1882, p. 8); 12th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 272, pl. 15, figs. 5, 6.—Miller, N. A. Geol. Pal., 1889, p. 172, text fig. 134.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 26, text figs.

Niagaran (Louisville): Louisville, Kentucky.

ANODONTOPSIS (part) Meeķ. See *Cycloconcha* Miller and *Ischyrodonta* Ulrich.

ANODONTOPSIS McCoy.

Genotype: *A. angustifrons* McCoy.

Anodontopsis, McCoy, Ann. Mag. Nat. Hist., 2d ser., 7, 1851, p. 53; Cont. British Pal., 1854, p. 188; Brit. Rocks and Foss., 1854, p. 270.—Pictet, Traite Pal., 2d ed., 3, 1855, p. 533.—Zittel, Handb. Pal., 2, 1881, p. 64.—Miller, N. A. Geol. Pal., 1889, p. 462.

Anodontopsis austrina Clarke.

Anodontopsis austrina Clarke, Archiv. Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 16, pl. 2, fig. 12.

Silurian: Rio Trombetas, Brazil.

Anodontopsis concinna Whiteaves.

Anodontopsis concinna Whiteaves, Pal. Foss. Geol. Surv. Canada, 3, pt. 1, 1884, p. 12, pl. 2, fig. 4; pl. 7, figs. 4, 4a; ibid., 3, pt. 2, 1895, p. 67 (loc. occ.).

Niagaran (Guelph): Galt and Durham, Ontario.

ANODONTOPSIS MILLERI Meek. See *Cycloconcha milleri*.

Anodontopsis putilla Clarke.

Anodontopsis putilla Clarke, Archiv. Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 16, pl. 2, figs. 10, 11.

Silurian: Rio Trombetas, Brazil.

ANODONTOPSIS? UNIONOIDES Meek. See *Ischyrodonta unionoides*.

Anodontopsis wabashensis Kindle and Breger.

Anodontopsis wabashensis Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 453, pl. 10, figs. 5-7.

Niagaran: Wabash, Indiana.

ANOLOTICHIA Ulrich.

Genotype: *Anolotichia ponderosa* Ulrich.

Anolotichia Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 381, 473; Geol. Minnesota, 3, 1893, p. 326; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 268.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 24.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 123.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 91; Zittel-Eastman Textb. Pal., 1913, p. 328.

Anolotichia impolita (Ulrich).

Crepipora impolita Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 77.

Anolotichia impolita Ulrich, Geol. Minnesota, 3, 1893, p. 327, pl. 28, figs. 15-20; Zittel's Textb. Pal. (Eng. ed.), 1896, p. 268, fig. 437a-c.—Sardeson, Jour. Geol., 9, 1901, p. 13, pl. A, fig. 12.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 123, fig. 182a.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 97, figs. 32, 33, pl. 7, fig. 11.—Zittel-Eastman Textb. Pal., 1913, p. 328, figs. 465a-c.

Black River (Decorah): Minneapolis, etc., Minnesota; Iowa.

Ordovician (Kuckers): Near Jewe, Esthonia, Russia.

Cotypes and *pleistotype*.—Cat. Nos. 43276, 57204, U.S.N.M.

Anolotichia ponderosa Ulrich.

Anolotichia ponderosa Ulrich, Geol. Surv. Illinois, 8, 1890, p. 320, fig. 8c; p. 473, pl. 41, figs. 3-3d; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 268, fig. 437d.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 328, fig. 465d.

Richmond (Fernvale): Wilmington, Illinois; Tennessee.

Cotype.—Cat. No. 43275, U.S.N.M.

ANOMALOCRINUS Meek and Worthen.

Genotype: *Heterocrinus? incurvus* Meek and Worthen.

Heterocrinus(?) subgenus *Anomalocrinus* Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 2d ser., 9, 1865, p. 148.

Hybocrinus (*Anomalocrinus*) Meek and Worthen, Geol. Rep. Illinois, 3, 1868, p. 327.

Anomalocrinus Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 17.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 295 (Rev. Pal., pt. 1, p. 72); *ibid.*, 1886, pp. 110, 111, 116, 135; *ibid.*, 1890, pp. 378, 380.—Zittel, Handb. Pal., 1, 1879, p. 350.—Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 111; *ibid.*, 5, 1882, p. 38, pl. 5, figs. 3, 3a, 3e.—Miller, N. A. Geol. Pal., 1889, p. 223.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 15, fig. 11; p. 332, pl. 14, fig. 8; pl. 15, fig. 10; Kongl. Sv. Vet. Akad. Handl., 25, No. 2, 1893, p. 20; Treatise on Zool. (Lankester), pt. 3, 1900, p. 146, fig. 58, 4.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 152.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 710.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 501.—Zittel, Grundzuge Pal., 1, 1910, p. 151.—Springer, Zittel-Eastman Textb. Pal., 1913, p. 213.

ANOMALOCRINUS—Continued.

Ataxiacrinus Lyon, Trans. Amer. Phil. Soc., n. s., 13, 1869, p. 463.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 247 (Rev. Pal., pt. 2, p. 73).

Ataxocrinus Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 146.—Zittel, Grundzüge Pal., 1, 1910, p. 151.

Anomalocrinus caponiformis (Lyon).

Ataxiacrinus caponiformis Lyon, Trans. Amer. Phil. Soc., n. s., 13, 1869, p. 464, pl. 27, figs. 1-3.

Anomalocrinus caponiformis Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 109, pl. 9, figs. 4-4a.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

Anomalocrinus incurvus (Meek and Worthen).

Heterocrinus (*Anomalocrinus*) *incurvus*, Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 148.

Hybocrinus? (*Anomalocrinus*) *incurvus* Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 327, text fig., pl. 4, figs. 3a, b.

Anomalocrinus incurvus Meek and Worthen, Geol. Surv. Ohio, 1, pt. 2, 1873, p. 17, pl. 2, figs. 6a-f.—Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 112; N. A. Geol. Pal., 1889, p. 224, fig. 246.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 716, pl. 3, figs. 1-1c.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 501, fig. 1813.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

ANOMALOCYSTIS Haeckel. See *Anomalocystites* Hall.**ANOMALOCYSTITES** Hall.

Genotype: *A. cornutus* Hall.

Anomalocystites Hall, Amer. Jour. Sci. Arts, 2d ser., 25, 1858, p. 279; Pal. New York, 3, 1859, p. 132.—Meek (part), Geol. Surv. Ohio, Pal., 1, 1873, p. 43.—Woodward, Geol. Mag., dec. 2, 7, 1880, pp. 193, 199.—Barrande, Syst. Sil. Center Boheme, 7, pt. 1, 1887, p. 89.—Miller, N. A. Geol. Pal., 1889, p. 224.—Jaekel, Zeits. d. d. geol. Ges., 52, 1900, p. 668.—Zittel-Eastman Textb. Pal., 1, 1900, p. 186.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 51.—Schuchert, Smiths. Misc. Coll., 47, pt. 2, 1904, p. 204.—Zittel, Grundzüge Pal., 1, 1910, p. 182.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 150.

Ateleocystites Woodward (part), Geol. Mag., dec. 2, 7, 1880, p. 193.

Anomalocystis Haeckel, Amphoroideen und Cystoideen, 1896, p. 40.

ANOMALOCYSTITES (ATELEOCYSTITES) BALANOIDES Meek. See *Ateleocystites balanoides*.**Anomalocystites cornutus** Hall.

Anomalocystites cornutus Hall, Pal. New York, 3, 1859, p. 133, pl. 7A, figs. 5-7.—Woodward, Geol. Mag., dec. 2, 7, 1880, p. 193, pl. 6, figs. 4, 5.—Schuchert, Smiths. Misc. Coll., 47, pt. 2, 1904, p. 206, pl. 40, figs. 4, 5.

Anomalocystis cornuta Haeckel, Amphoroideen und Cystoideen, 1896, p. 41, pl. 2, figs. 8, 9.

Helderbergian (Manlius transition beds or Coeymans): Litchfield, Herkimer County, New York.

Plesiotypes.—Cat. Nos. 35078, 35079, U.S.N.M.

ANOMALOCYSTITES HUXLEYI Miller. See *Ateleocystites huxleyi*.

ANOMALODONTA Miller.Genotype: *A. gigantea* Miller.

Anomalodonta, Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 16; 2, 1875, p. 280.—White, Amer. Jour. Sci. Arts, 3d ser., 8, 1874, pp. 218, 219.—Zittel, Handb. Pal., 2, 1881, p. 36.—Miller, N. A. Geol. Pal., 1889, p. 462.—Ulrich, Geol. Surv. Ohio, 7, 1893, p. 636.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 978.—Grabau and Shimer, N. A. Index Fossils, 1 1909, p. 430.

Anomalodonta alata (Meek).

Ambonychia (Megaptera) *alata* Meek, Proc. Acad. Nat. Sci. Philadelphia, 1872, p. 319; Geol. Surv. Ohio, Pal., 1, 1873, p. 131, pl. 11, fig. 9; pl. 12, fig. 10.

Megaptera alata White, Cincinnati Quart. Jour. Sci., 1, 1874, p. 327.

Anomalodonta alata Miller, Cincinnati Quart. Jour. Sci., 1874, p. 16, pp. 223, 328.—Ulrich, Geol. Surv. Ohio, 7, 1893, p. 638, pl. 46, fig. 1.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 431.

Richmond (Arnheim and Waynesville): Morrow, Clarksville, etc., Ohio; Versailles, etc., Indiana.

Pteriotype.—Cat. No. 46087, U.S.N.M.

Anomalodonta casei (Meek and Worthen).

Ambonychia (Megaptera) *Casei* Meek and Worthen, Proc. Chicago Acad. Sci., 1, 1866, p. 22.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 133, pl. 11, fig. 8.—White, 2d Ann. Rep. Indiana Dep. Stat. Geol., 1880, p. 491, pl. 1, figs. 1, 2.

Megaptera Casei Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 337, pl. 4, fig. 9a, b.

Anomalodonta casei Miller, Cincinnati Quart. Jour. Sci., 1, 1874, pp. 15, 16, p. 224. Richmond (Whitewater): Richmond, Indiana.

Anomalodonta costata (Meek).

Ambonychia costata James, Cat. Low. Sil. Fossils Cincinnati Group, 1871, p. 13 (not described).—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 130, pl. 12, figs. 5a, b, c.—Miller, Cincinnati Quart. Jour. Sci., 1, p. 15.

Anomalodonta costata Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 987, pl. 62, figs. 6-6a.

Richmond (Arnheim and Waynesville): Clarksville, etc., Ohio.

Anomalodonta gigantea Miller.

Anomalodonta gigantea Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 17, figs. 7, 8, 9; also p. 327; N. A. Geol. Pal., 1889, p. 462, figs. 776, 777; p. 463, fig. 778.—Ulrich, Geol. Surv. Ohio, 7, 1893, p. 637, pl. 50, figs. 1 to 4.—Cumings,

32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 968, pl. 43, figs. 1-1b.

Richmond (Arnheim-Whitewater): Versailles, etc., southeastern Indiana; Ohio.

Pteriotype.—Cat. No. 46088, U.S.N.M.

Anomalodonta plicata Ulrich.

Anomalodonta plicata Ulrich, Geol. Surv. Ohio, 7, 1893, p. 638, pl. 46, figs. 2, 3.

Maysville (Corryville): Cincinnati, Ohio.

Holotype.—Cat. No. 46089, U.S.N.M.

ANOMALOIDES Ulrich.Genotype: *A. reticulatus* Ulrich.

Anomaloides Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 92.—James, J. F., *ibid.*, 8, 1885, pp. 165, 166.—Ulrich, Amer. Geol., 1, 1888, p. 324.

Anomalospongia Ulrich, Geol. Minnesota, 3, pt. 1, 1895, pp. 68-69 (ext. 1893).

Anomaloides reticulatus Ulrich

Anomaloides reticulatus Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 92, pl. 4, figs. 6, 6a-b.

Anomalospongia reticulata Ulrich, Geol. Minnesota, 3, pt. 1, 1895, p. 71, fig. 1, pl. F, figs. 13-15 (ext. 1893).

Receptaculites reticulatus James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1885, p. 166; 9, 1886, p. 249; 14, 1891, p. 62.

Maysville (Mt. Hope): Covington, Kentucky.

Cotypes.—Cat. No. 46546, U.S.N.M.

ANOMALOSPONGIA Ulrich. See *Anomaloides* Ulrich.

ANOMIA BILOBA Linnæus. See *Bilobites bilobus*.

ANOMIA RETICULARIS Linnæus. See *Atrypa reticularis*.

ANOMITES EXPORRECTUS Wahlenberg. See *Cyrtia exporrecta*.

ANOMITES LENTICULARIS Wahlenberg. See *Eoorthis* (Orusia) *lenticularis*.

ANOMITES TRANSVERSALIS Wahlenberg. See *Plectambonites transversalis*.

ANOMOCARE Angelin.

Genotype: *A. læve* Angelin.

Anomocare Angelin, Pal. Scandinavica, 3d ed., 1878, p. 24.—Zittel, Handb. Pal., 2, 1885, p. 601.—Matthew, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 60.—Koken, Die Leitfossilien, Leipzig, 1896, p. 22.—Walcott, Smiths. Misc. Coll., 57, No. 4, 1911, p. 87; Research in China, 3, Carnegie Institution, 1913, p. 187 (figures genotype).

Anomocare parvula Weller.

Anomocare parvula Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 120, pl. 3, fig. 12.

Upper Cambrian or Ozarkian (Kittatinny): Newton, New Jersey.

ANOMOCARE SPINIGER Matthew. See *Acantholenus spiniger*.

Anomocare stenotoides (Matthew).

Leptoplastus stenotoides Matthew, Canadian Rec. Sci., 3, 1889, p. 486, fig. 2.

Anomocare stenotoides Matthew, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 61, pl. 13, fig. 3 a-d; Bull. Nat. Hist. Soc. New Brunswick, 16, 1898, p. 42; Trans. Royal Soc. Canada, 2d ser., 4, sec. 4, 1898, p. 139, pl. 2, figs. 5 a-i.

Canadian (Bretonian—Div. C 3b): Long Island, Kennebecasis River, New Brunswick.

ANOMOCARELLA Walcott.

Genotype: *A. chinensis* Walcott.

Anomocarella Walcott, Proc. U. S. Nat. Mus., 29, 1905, p. 54; Smiths. Misc. Coll., 57, 1911, p. 91; Research in China, 3, Carnegie Inst., 1913, p. 195.

Anomocarella belli (Billings).

Dikelocephalus Belli Billings, Canadian Nat. Geol., 5, 1860, p. 311, fig. 7; Geol. Canada, Geol. Surv. Canada, 1863, p. 236, fig. 260; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 403, fig. 378.

Dicelloccephalus Belli Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 11, footnote.

Anomocarella belli Walcott, Smiths. Misc. Coll., 57, 1914, p. 349 (gen. ref.).

Ozarkian? (Levis—erratic): Point Levis, Quebec.

Anomocarella? oweni (Billings).

Dikelocephalus Oweni Billings, Canadian Nat. Geol. 5, 1860, p. 310, fig. 8; Geol. Canada, Geol. Surv. Canada, 1863, p. 236, fig. 259; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 402, fig. 379.

Dicelloccephalus Oweni Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 11, footnote.

Anomocarella? oweni Walcott, Smiths. Misc. Coll., 57, 1914, p. 251 (gen. ref.).

Ozarkian? (Levis—erratic): Point Levis, Quebec.

Anomocarella? planifrons (Billings).

Dikelocephalus planifrons Billings, Canadian Nat. Geol., 5, 1860, p. 309, fig. 6; Geol. Canada, Geol. Surv. Canada, 1863, p. 236, fig. 256; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 401, fig. 377.

Dicelloccephalus planifrons Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 11, footnote.

Anomocarella? planifrons Walcott, Smiths. Misc. Coll., 57, 1914, p. 352 (gen. ref.).

Ozarkian? (Levis—erratic): Point Levis, Quebec.

ANOMOCLONELLA Rauff.

Genotype: *A. zitteli* Rauff.

Anomoclonella Rauff, Palaeontographica, 41, 1895, p. 226.

Anomoclonella zitteli (Rauff).

Anomoclonella Zitteli Rauff, Palaeontographica, 40, 1894, pl. 8, figs. 1-4; 41, 1895, pp. 226-242, figs. 78-83.

Niagaran (Brownsport): Decatur County, Tennessee.

ANOPIOTHECA (part) of authors. See *Coelospira* Hall.**ANOPTERA** Ulrich.

Genotype: *A. miseneri* Ulrich.

Anoptera Ulrich, Geol. Surv. Ohio, 7, 1893, p. 649.

Anoptera miseneri Ulrich.

Anoptera miseneri Ulrich, Geol. Surv. Ohio, 7, 1893, p. 650, pl. 50, figs. 5-9.

Richmond: Clarksville, Ohio (Waynesville); Richmond, Indiana (Whitewater).

Cotypes.—Cat. Nos. 46090, 46091, U.S.N.M.

ANORTHASTER Schuchert.

Genotype: *Palaeaster miamiensis* Miller

Anorthaster Schuchert in Frech, Cat. Foss., 1, Anim., pt. 3, 1914, p. 11 (nom. nud.); Bull. U. S. Nat. Mus., 88, 1915, p. 125.

Anorthaster miamiensis (Miller).

Palaeaster miamiensis Miller, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 143, pl. 4, fig. 3.—James, Ibid. 18, 1895, p. 129.

Anorthaster miamiensis Schuchert, in Frech, Cat. Foss., 1, Anim., pt. 3, 1914, p. 11; Bull. U. S. Nat. Mus., 88, 1915, p. 127, pl. 13, fig. 4; pl. 20, fig. 1.

Richmond (Waynesville or Liberty): Waynesville, Ohio.

Holotype.—Cat. No. 40880, U.S.N.M.

ANTHASPIDELLA Ulrich and Everett.

Genotype: *A. mammulata* Ulrich and Everett.

Anthaspidella Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 256.—Miller, N. A. Geol. Pal., 1889, p. 153.

Anthaspidella fenestrata Ulrich and Everett.

Anthaspidella fenestrata, Ulrich and Everett, Geol. Surv. Illinois, 1890, p. 264, pl. 2, fig. 1.

Black River (Platteville): Near Dixon, Illinois.

***Anthaspidella firma* Ulrich and Everett.**

Anthaspidella firma Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 263, pl. 2, figs. 3, 3a.

Black River (Platteville): Near Dixon, Illinois.

***Anthaspidella florifera* Ulrich and Everett.**

Anthaspidella florifera Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 259, pl. 1, fig. 2; pl. 4, fig. 2.

Black River (Platteville): Near Dixon, Illinois.

***Anthaspidella grandis* Ulrich and Everett.**

Anthaspidella grandis Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 262, pl. 2, figs. 2, 2a.

Black River (Platteville): Near Dixon, Illinois.

***Anthaspidella? magnifica* Ulrich and Everett.**

Anthaspidella? magnifica Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 265, pl. 8, figs. 2, 2a-c.

Black River (Platteville): Near Dixon, Illinois.

***Anthaspidella mammulata* Ulrich and Everett.**

Anthaspidella mammulata Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 258, pl. 1, figs. 1, 1a-d.

Black River (Platteville): Near Dixon, Illinois.

***Anthaspidella obliqua* Ulrich and Everett.**

Anthaspidella obliqua Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 265, pl. 4, figs. 1, 1a.

Black River (Platteville): Near Dixon, Illinois.

***Anthaspidella parvistellata* Ulrich and Everett.**

Anthaspidella parvistellata Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 260, pl. 1, fig. 3.

Black River (Platteville): Near Dixon, Illinois.

***Anthaspidella scutula* Ulrich and Everett.**

Anthaspidella scutula Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 261, pl. 3, fig. 1, 1a.

Black River (Platteville): Near Dixon, Illinois.

ANTHES Goldfuss. See *Peltura* Milne-Edwards.

ANTHOCRINUS Müller. See *Cyathocrinus* Miller.

ANTHOCYSTIS Haeckel. See *Callocystites* Hall.

ANTHOCYSTIS HALLIANA Haeckel. See *Callocystites jewetti*.

ANTHOPHYLLUM DENTICULATUS Goldfuss. See *Zaphrentis denticulatus*.

ANTHOPHYLLUM EXPANSUM Owen. See *Ptychophyllum expansum*.

ANTIRHYNCHONELLA Quenstedt. See *Conchidium* Linnæus.

APARCHITES Jones.

Genotype: *A. whiteavesi* Jones.

Aparchites Jones, Ann. Mag. Nat. Hist., 6th ser., 3, 1889, p. 384.—Miller, N. A. Geol. Pal., 1889, p. 529.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 643; Zittel-Eastman Textb. Pal., 1, 1900, p. 644.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 343.—Baesler, Zittel-Eastman Textb. Pal., 2d. ed., 1913, p. 737.

Aparchites arrectus Ulrich.

Aparchites arrectus Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 646, pl. 43, figs. 35, 36.

Black River (Decorah): St. Paul, Minnesota.

Holotype.—Cat. No. 41836, U.S.N.M.

Aparchites billingsi (Jones).

Leperditia Billingsi Jones, Ann. Mag. Nat. Hist., 5th ser., 8, 1881, p. 345, pl. 20, fig. 9.

Aparchites billingsii Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 3, 1897, p. 231.

Silurian or Devonian: Lake Winnepegosis, Canada.

Aparchites chatfieldensis Ulrich.

Aparchites chatfieldensis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 646, pl. 43, figs. 37, 38.

Black River (Decorah): Chatfield, Minnesota.

Holotype.—Cat. No. 41829 U.S.N.M.

Aparchites concinnus (Jones).

Cytheropsis concinna Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 249, pl. 10, figs. 3, 4; Geol. Surv. Canada, dec. 3, 1858, p. 99.

Primitia concinna Jones and Holl, Ann. Mag. Nat. Hist., 3d ser., 16, 1865, p. 424.

Aparchites concinnus Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 99.

Black River (Leray): Pauquettes Rapids, Allumette Island, Ottawa River, Canada.

Aparchites ellipticus Ulrich.

Aparchites ellipticus Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 644, pl. 43, figs. 15-17.

Black River (Decorah): Minneapolis, Minnesota.

Cotypes.—Cat. No. 41832 U.S.N.M.

Aparchites fimbriatus (Ulrich).

Leperditia fimbriata Ulrich, Amer. Geol., 10, 1892, p. 268, pl. 9, figs. 34-36.

Aparchites fimbriatus Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 645, pl. 45, figs. 10-12.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 343, fig. 1657b.

Richmond (Maquoketa): Spring Valley, Minnesota.

Holotype.—Cat. No. 41834, U.S.N.M.

Aparchites gordonii Ulrich and Bassler.

Aparchites gordonii Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 515, pl. 95, figs. 1-3.

Helderbergian (Keyser): Cumberland, Maryland.

Holotype.—Cat. No. 53283, U.S.N.M.

Aparchites granlabiatus (Ulrich).

Leperditia granlabiata Ulrich, Amer. Geol., 10, 1892, p. 267, pl. 9, figs. 31-33.

Aparchites granlabiatus Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 644, pl. 45, figs. 21-23.

Black River (Decorah): St. Paul, Minnesota.

Holotype.—Cat. No. 41828, U.S.N.M.

Aparchites granlabiatus neglectus Ulrich.

Aparchites granlabiatus neglectus Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 645.

Black River (Decorah): Minneapolis, Minnesota.

Cotypes.—Cat. No. 41835, U.S.N.M.

Aparchites millepunctatus (Ulrich).*Leperditia millepunctata* Ulrich, Amer. Geol., 10, 1892, p. 268, pl. 9, figs. 37-39.*Aparchites millepunctatus* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 645, pl. 45, figs. 16-18.

Black River (Decorah): Fountain, Minnesota.

Holotype.—Cat. No. 41837, U.S.N.M.**Aparchites minutissimus** (Hall).*Leperditia* (Isachilina) *minutissima* Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 231, pl. 8, fig. 13 (adv. sheet 1871, p. 7).—Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 102, pl. 4, fig. 4.*Leperditia minutissima* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 122.*Aparchites minutissimus* Ulrich, Geol. Surv. Canada, Cont. Micro-Pal., pt. 2, 1889, p. 49, pl. 9, fig. 5.—Whiteaves, *ibid.*, Pal. Foss., 3, pt. 2, 1895, p. 126 (loc. occ.).

Eden-Richmond: Cincinnati, Ohio, and vicinity; Stony Mountain, Manitoba, Anticosti, etc.

Aparchites minutissimus robustus Ruedemann.*Aparchites minutissimus* var. *robustus* Ruedemann, Bull. New York State Mus., 49, 1901, p. 74, pl. 7, figs. 6-11.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

Aparchites minutissimus trentonensis Ulrich.*Aparchites minutissimus* var. *trentonensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 646, pl. 43, figs. 18-20.

Black River (Decorah) and Trenton (Prosser): Fountain, Cannon Falls, etc., Minnesota.

Cotypes.—Cat. Nos. 41302, 41303, U.S.N.M.**Aparchites mundulus** Jones.*Aparchites mundulus* Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, p. 62, pl. 10, figs. 12a, b.

Trenton: Falls of Lorette, Quebec.

Aparchites oblongus Ulrich.*Aparchites oblongus* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 137, pl. 10, figs. 10a-10c.

Richmond (Arnheim): Middletown, Ohio.

Holotype.—Cat. No. 41811, U.S.N.M.**Aparchites parvulus** Jones.*Aparchites parvulus* Jones, Geol. Surv. Canada, Pal. Foss., 3, pt. 3, 1897, p. 230, pl. 22, figs. 4a-4c.

Black River or Richmond: Little Black Island, Lake Winnipeg, Canada.

Aparchites tyrrellii Jones.*Aparchites Tyrrellii* Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, p. 62, pl. 13, figs. 14a-c.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 3, 1897, p. 242 (loc. occ.).

Black River or Richmond: Great Black Island, Lake Winnipeg, Canada.

APARCHITES UNICORNIS Ulrich. See *Primitiella unicornis*.**Aparchites whiteavesi** Jones.*Aparchites Whiteavesi* Jones, Ann. Mag. Nat. Hist., 6th ser., 3, 1889, p. 384, figs. 5, 6, pl. 17, fig. 10.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 3, 1897, p. 230.

Black River or Richmond: Lower Fort Garry, St. Andrew, Manitoba.

APATOKEPHALUS Brögger.Genotype: *Trilobites serratus* Boeck.*Apatokephalus* Brögger, *Nyt. Mag. f. Naturvid.*, 36, 1897, p. 184.Tramoria Reed, *Quart. Jour. Geol. Soc. London*, 55, 1899, p. 758, pl. 49, figs. 14-16; *Geol. Mag.*, dec. 4, 7, 1900, p. 46.***Apatokephalus corax*** (Billings).*Dikelocephalus? corax* Billings, *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 334, fig. 322a, b.—Matthew, *Trans. Royal Soc. Canada*, 10, sec. 4, 1893, p. 11, footnote.

Ozarkian? (Levis—erratic): Point Levis, Quebec.

Apatokephalus finalis (Walcott).*Dicelloccephalus finalis* Walcott, *Mon. U. S. Geol. Surv.*, 8, 1884, p. 89, pl. 12, figs. 12, 12a, 22.—Matthew, *Trans. Royal Soc. Canada*, 10, sec. 4, 1893, p. 11, footnote.*Apatokephalus finalis* Brögger, *Nyt. Mag. f. Naturvid.*, 1897, p. 175, fig. 6a, p. 184.

Upper Pogonip: Ridge east of Hamburg Ridge, Eureka District, Nevada.

Cotypes.—Cat. No. 24563, U.S.N.M.**APATOKEPHALUS MAGNIFICUS** Brögger. See *Hungaia magnifica*.**APATOKEPHALUS SCHLOTHEIMI** Billings. See *Remopleurides? schlotheimi*.**APHETOCERAS** Hyatt.Genotype: *A. americanum* Hyatt.*Aphetoceras* Hyatt, *Proc. Amer. Phil. Soc.*, 32, 1894, p. 447.—Miller, *N. A. Geol. Pal.*, 2d App., 1897, p. 771.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 65.***Aphetoceras americanum*** Hyatt.*Aphetoceras americanum* Hyatt, *Proc. Amer. Phil. Soc.*, 32, 1894, p. 447, pl. 6, figs. 5-8.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 65.

Canadian: Port au Choix, Newfoundland.

Aphetoceras attenuatum Hyatt.*Lituites farnsworthi* Billings (part), *Geol. Surv. Canada, Pal. Foss.*, 1, 1861, p. 21.*Aphetoceras attenuatum* Hyatt, *Proc. Amer. Phil. Soc.*, 32, 1894, p. 449.—Ruedemann, *Bull. New York State Mus.*, 90, *Pal.*, 14, 1906, p. 475.

Canadian (Beekmantown): Phillipsburg, Missisquoi County, Quebec.

Aphetoceras boreale Hyatt.*Aphetoceras boreale* Hyatt, *Proc. Amer. Phil. Soc.*, 32, 1894, p. 448, pl. 5, figs. 15-17.

Canadian: Schooner Island, Newfoundland.

Aphetoceras complanatum (Shumard).*Lituites complanata* Shumard, *Trans. Acad. Sci. St. Louis*, 2, 1863, p. 107.—Keyes, *Missouri Geol. Surv.*, 5, 1895, p. 225.*Aphetoceras complanatum* Miller, *N. A. Geol. Pal.*, 2d App., 1897, p. 771 (gen. ref.).

Canadian (Yellville): Ozark County, Missouri.

Aphetoceras farnsworthi (Billings).*Lituites Farnsworthi* Billings, *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 21, fig. 24 (adv. sheets, 1861); *Geol. Vermont*, 2, 1862, p. 958, fig. 364; *Rep. Econ. Geol.*, etc., *Vermont*, 1862, p. 230, fig. 364; *Geol. Canada, Geol. Surv. Canada*,1863, p. 277, fig. 283.—Lesley, *Geol. Surv. Pennsylvania, Rep. P 4*, 1889, p. 354, fig.

Aphetoceras farnsworthi—Continued.

Aphetoceras farnsworthi Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 448.—Ruedemann, Bull. New York State Mus., 90, Pal., 14, 1906, p. 473, fig. 24.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 65, fig. 1273.

Canadian (Beekmantown): Phillipsburg, Missisquoi County, Quebec.

APHYLLOSTYLUS Whiteaves.Genotype: *A. gracilis* Whiteaves.

Aphylostylus Whiteaves, Ottawa Naturalist, 18, 1904, p. 113.

Aphylostylus gracilis Whiteaves.

Aphylostylus gracilis Whiteaves, Ottawa Nat., 18, 1904, p. 114; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 278, pl. 24, figs. 1, 1a.

Niagaran: Stonewall, Manitoba.

APIOCERAS Saemann. See *Poterioceras* McCoy.**APIOCRINITE(?)** Anthony. See *Glyptocrinus decadactylus*.**APIOCYSTIS** Haeckel. See *Apicystites* Forbes.**APIOCYSTITES** Hall. See *Hallicystis* Jaekel.**APIOCYSTITES** Jaekel. See *Lepocrinites* Conrad.**APIOCYSTITES** Forbes.Genotype: *A. pentrematoides* Forbes.

Apicystites Forbes, Mem. Geol. Surv. Great Britain, 2, pt. 2, 1848, pp. 501, 503.—Hall, Pal. New York, 2, 1852, p. 242.—Muller, Ann. Mag. Nat. Hist., 2d ser., 13, 1854, p. 248.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 298.—Chapman, Canadian Jour., n. s., 2, 1857, p. 303.—Hall, Pal. New York, 3, 1861, pp. 126, 151.—Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 354.—Miller, N. A. Geol. Pal., 1889, p. 224.—Jaekel, Stammesg. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 279 (part).—Schuchert, Smiths. Misc. Coll., 47, pt. 2, 1904, p. 210.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 154.

Apicystis Haeckel, Amphorideen u. Cystoideen, Leipzig, 1896, p. 132.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 61.—Zittel, Grundzuge Pal., 1, 1910, p. 187.

Lepadocrinus Bather (part), Treatise on Zool. (Lankester), pt. 3, 1900, p. 61.

APIOCYSTITES CANADENSIS Billings. See *Callocystites canadensis*.**Aplocystites elegans** (Hall).

Apicystites elegans Hall, Pal. New York, 2, 1852, p. 243, pl. 51, figs. 1-17.—Jaekel, Stammesg. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 282.—Schuchert, Smiths. Misc. Coll., 47, pt. 2, 1904, p. 212, pl. 34, figs. 4, 5.

Apicystis elegans Haeckel, Amphorideen u. Cystoideen, 1896, pl. 3, figs. 4-9. Clinton (Rochester): Lockport, New York; Grimsby, Ontario.

APIOCYSTITES GEBHARDII Jaekel. See *Lepocrinites gebhardi*.**APIOCYSTITES HURONENSIS** Billings. See *Brockocystis huronensis*.**APIOCYSTITES IMAGO** Hall. See *Hallicystis imago*.**APIOCYSTITES TECUMSETH** Billings. See *Brockocystis tecumseth*.**APLOCRINUS** D'Orbigny. See *Haplocrinus* Steininger.**APSIDOCERAS** Hyatt.Genotype: *Gyroceras* (Lituites) *magnificum* Billings.

Apsidoceras Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 289.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 695.

APSIDOCERAS INSIGNE Whiteaves. See *Litoceras insigne*.

APSIDOCERAS MAGNIFICUM (Billings).

Gyroceras (*Lituites*) *magnificum* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 307.

Lituites? *magnificum* Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 23 (loc. ref.).

Apsidoceras magnificum Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 289.

Richmond (English Head and Charleton): Southwest End Lighthouse, Anticosti.

ARABELLITES Hinde.

Genotype: *A. hamatus* Hinde.

Arabellites Hinde, Quart. Jour. Geol. Soc. London, 25, 1879, p. 377.—Miller, N. A. Geol. Pal., 1889, p. 517.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 240.

ARABELLITES ACICULATUS James.

Arabellites aciculatus James, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 148, pl. 7, fig. E.

Maysville (Fairmount): Near Loveland, Ohio.

ARABELLITES ASCIALIS Hinde.

Arabellites ascialis Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 378, pl. 18, fig. 21,

Cincinnatian (Pulaski): Toronto, Ontario.

ARABELLITES CERVICORNIS Hinde.

Arabellites cervicornis Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 379, pl. 19, figs. 8, 12.

Cincinnatian (Pulaski): Toronto, Ontario.

ARABELLITES CORNUTUS Hinde.

Arabellites cornutus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 377, pl. 18, figs. 13-15.

Cincinnatian (Pulaski): Toronto, Ontario.

ARABELLITES CRENULATUS Hinde.

Arabellites crenulatus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 379, pl. 19, fig. 9.

Cincinnatian (Pulaski): Toronto, Ontario.

ARABELLITES CRISTATUS Hinde.

Arabellites cristatus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 378, pl. 19, fig. 7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 241, fig. 1528g.

Eumicites cristatus Miller, N. A. Geol. Pal., 1889, p. 518 (gen. ref.).

Cincinnatian (Pulaski): Toronto, Ontario.

ARABELLITES CUSPIDATUS Hinde.

Arabellites cuspidatus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 378, pl. 18, fig. 19.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 241, fig. 1527a.

Cincinnatian (Pulaski): Toronto, Ontario.

ARABELLITES ELEGANS Hinde.

Arabellites elegans Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 382, pl. 20, figs. 5, 7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 241, fig. 1529b.

Upper Medinan (Cataract): Toronto, Ontario.

Arabellites gibbosus Hinde.

Arabellites gibbosus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 378, pl. 18, fig. 21.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 241, fig. 1527c.

Cincinnatian (Pulaski): Toronto, Ontario.

Arabellites hamatus Hinde.

Arabellites hamatus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 377, pl. 18, fig. 12.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 240, fig. 1526d.

Cincinnatian (Pulaski): Toronto, Ontario.

Arabellites hindei James.

Arabellites hindei James, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 149, pl. 7, fig. D.

Maysville (Fairmount): Near Loveland, Ohio.

Arabellites lunatus Hinde.

Arabellites lunatus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 378, pl. 19, fig. 4-6.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 241, fig. 1528d.

Cincinnatian (Pulaski): Toronto, Ontario.

Arabellites? obliquus Hinde.

Arabellites? obliquus Hinde, Quart. Jour. Geol. Soc. London, 1879, p. 379, pl. 19, fig. 15.

Cincinnatian (Pulaski): Toronto, Ontario.

Arabellites ovalis Hinde.

Arabellites ovalis Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 378, pl. 18, fig. 16.

Cincinnatian (Pulaski): Toronto, Ontario.

Arabellites pectinatus Hinde.

Arabellites pectinatus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 379, pl. 19, fig. 11.

Cincinnatian (Pulaski): Toronto, Ontario.

Arabellites procursus Foerste.

Arabellites procursus Foerste, Amer. Geologist, 2, 1888, p. 417, fig. 8; Geol. Surv. Ohio, Pal., 7, 1893, p. 517, fig. 3.

Richmond (Elkhorn): Todds Fork, near Wilmington, Ohio.

Arabellites quadratus Hinde.

Arabellites quadratus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 379, pl. 19, fig. 14.

Cincinnatian (Pulaski): Toronto, Ontario.

Arabellites rectus Hinde.

Arabellites rectus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 378, pl. 18, fig. 18.

Cincinnatian (Pulaski): Toronto, Ontario.

Arabellites scutellatus Hinde.

Arabellites scutellatus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 379, pl. 19, fig. 16.

Cincinnatian (Pulaski): Toronto, Ontario.

Arabellites similis Hinde.

Arabellites similis Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 382, pl. 20, fig. 8.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 241, fig. 1529d.

Upper Medinan (Cataract): Toronto, Ontario.

ARACHNOCRINUS FISIFORMIS Meek and Worthen. See *Lecanocrinus pisiformis*.

ARACHNOPHYLLUM Dana. See *Strombodes* Schweigger.

ARCA Linnæus. Not a Paleozoic genus.

Arca? browni Salter.

Arca? Brownii Salter, Quart. Jour. Geol. Soc. London, 17, 1861, p. 69, pl. 4, figs. 19, 20.

Silurian: West slope of Mt. Illampu, Bolivia.

Arca? gracilis Hoek.

Arca gracilis Hoek, Neues Jahrb., Min., Geol., Pal., 34, 1912, pl. 8, fig. 17.

Ordovician: Totoropampa, Bolivia.

ARCA POSTSTRIATA D'Orbigny. See *Lyrodesma poststriatum*.

ARCHÆOCRINUS Wachsmuth and Springer.

Genotype: *Glyptocrinus lacunosus* Billings.

Archæocrinus Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 363 (Rev. Pal., pt. 2, p. 189); *ibid.*, 1885, p. 318; *ibid.*, 1890, p. 366.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 217.—Carpenter, Phil. Trans. Roy. Soc. London, 174, 1884, pp. 929, 930.—Miller, N. A. Geol. Pal., 1889, p. 225.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 253.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 200, fig. 125.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 145.—Weller, Bull. Chicago Acad. Nat. Hist. Surv., 4, pt. 1, 1900, p. 88, fig. 41.—Zittel, Grundzüge Pal., 1, 1910, p. 161.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 550.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 188.

ARCHÆOCRINUS ASPERATUS Wachsmuth and Springer. See *Deocrinus asperatus*.

ARCHÆOCRINUS ASPERATUS Miller and Gurley. See *Diabolocrinus asperatus*.

Archæocrinus? deliculatus Hudson.

Archæocrinus? deliculatus Hudson, Bull. New York State Mus., 107, 1907, p. 129, fig. 8.

Chazy (Valcour): Valcour Island, Lake Champlain, New York.

Archæocrinus depressus Weller.

Archæocrinus depressus Weller, Bull. Chicago Acad. Sci. Nat. Hist. Surv., 4, pt. 1, 1900, p. 89, pl. 3, figs. 9–10.

Niagaran (Racine): Bridgeport, Cicero, and Hawthorne, Illinois.

Archæocrinus desideratus W. R. Billings.

Archæocrinus desideratus W. R. Billings, Trans. Ottawa Field Nat. Club, 2, 1885, p. 249, pl. fig.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 257, pl. 10, figs. 4a, b.—Bather, Treatise on Zool., pt. 3, Echinodermata, London, 1900, p. 200, fig. 125.

Trenton (Curdsville): Ottawa, Ontario.

Archæocrinus knoxensis Miller and Gurley.

Archæocrinus knoxensis Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 6, 1895, p. 34, pl. 3, fig. 12–15.

Chazy (Ottoese): Knox County, Tennessee.

Archæocrinus lacunosus (Billings).

Glyptocrinus lacunosus Billings, Geol. Surv. Canada, Rep. Progress for 1853-1856, 1857, p. 261; Geol. Surv. Canada, dec. 4, 1859, p. 61, pl. 8, figs. 3a-3e.

Archæocrinus lacunosus Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 364 (Rev. Pal., pt. 2, p. 190); Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 255, pl. 10, fig. 1.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 11 (loc. occ.).

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

Archæocrinus marginatus (Billings).

Glyptocrinus marginatus Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 260; Geol. Surv. Canada, dec. 4, 1859, p. 59, pl. 9, fig. 1a.

Archæocrinus marginatus Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 364 (Rev. Pal., pt. 2, p. 190); Mem. Mus. Comp. Zool., Harvard, 20, 1897, pp. 254, 275, pl. 20, fig. 2

Trenton (Curdsville): Ottawa, Ontario.

Archæocrinus microbasilis (Billings).

Thysanocrinus (*Rhodocrinus*) *microbasilis* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 264.

Rhodocrinus microbasilis Billings, Geol. Surv. Canada, dec. 4, 1859, p. 63, pl. 6, fig. 2.

Archæocrinus microbasilis Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 364 (Rev. Pal., pt. 2, p. 190); Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 256, pl. 10, fig. 2a-c.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 11 (loc. occ.).

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

Archæocrinus parvus Miller and Gurley.

Archæocrinus parvus Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 21, pl. 2, figs. 26-28.—Miller, N. A. Geol. Pal., 1897, 2d App., p. 734, fig. 1298.

Chazy (Ottoese): Knox County, Tennessee.

Archæocrinus peculiaris Miller and Gurley.

Archæocrinus peculiaris Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 17, pl. 2, figs. 1-3.—Miller, N. A. Geol. Pal., 1897, 2d App., p. 734, figs. 1299-1300.

Chazy (Ottoese): Knox County, Tennessee.

Archæocrinus pyriformis (Billings).

Thysanocrinus (*Rhodocrinus*) *pyriformis* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 262.

Rhodocrinus pyriformis Billings, Geol. Surv. Canada, dec. 4, 1859, p. 61, pl. 6, figs. 1a-d.

Archæocrinus pyriformis Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 364 (Rev. Pal., pt. 2, p. 190) (gen. ref.); Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 255, pl. 10, fig. 3a, b.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 550.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 11.

Trenton (Curdsville): Ottawa, Montreal, and Kirkfield, Canada.

ARCHÆOCRINUS? RAMULOSUS Wachsmuth and Springer. See *Glyptocrinus ramulosus*.

ARCHÆOCRINUS SCULPTUS Wachsmuth and Springer. See *Diabolocrinus vespertalis*.

ARCHÆOCYATHUS MINGANENSIS Billings. See *Archæoscyphia minganensis*.

- ARCHÆOSCYPHIA** Hinde. Genotype: *Archæoscyathus minganensis* Billings.
Archæoscyathus (part) Billings, *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 354.
Archæoscyphia Hinde, *Quart. Jour. Geol. Soc. London*, 45, 1889, p. 142.—Rauff, *Palæontographica*, 40, 1894, p. 238.
- Archæoscyphia minganensis*** (Billings).
Petraia minganensis Billings, *Canadian Nat. Geol.*, 4, 1859, p. 346.
Archæoscyathus Minganensis Billings, *New sp. L. Sil. Foss.*, 1861, p. 5; *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 354, figs. 342a, b, 343a, 344; *Geol. Vermont*, 2, 1861, p. 945; *Rep. Econ. Geol.*, etc., *Vermont*, 1862, p. 217.—Nicholson, *Man. Pal.*, 1872, p. 68, fig. 15.—Dawson, *Life's Dawn on Earth*, 1875, p. 152, fig. 38.—Roemer, *Leth. geog.*, 1, *Leth. Pal.*, *Atlas*, 1876, pl. 2, fig. 2a; *Ibid.*, 1880, p. 299, pl. 2, figs. 2a, b.—Zittel, *Handb. Pal.*, 1, 1880, pp. 173, 728.—Hinde, *Quart. Jour. Geol. Soc.*, *London*, 40, 1884, p. 835; *Geol. Mag.*, dec. 3, 5, 1888, p. 226, 227, fig. 1.
Archæoscyphia minganensis Hinde, *Quart. Jour. Geol. Soc. London*, 45, 1889, p. 143, pl. 5, figs. 12–14; *Canadian Rec. Sci.*, 3, 1889, p. 373.—Rauff, *Palæontographica*, 40, 1894, p. 240, pl. 1, figs. 1–10.
Ethmophyllum minganense Walcott, *Bull. U. S. Geol. Surv.*, 30, 1886, p. 77, fig. 6–8.—Lesley, *Geol. Surv. Pennsylvania*, *Rep. P* 4, 1889, pp. xxii, 225, figs. *Canadian (Romaine): Mingan Islands, Canada.*
- ARCHINACELLA** Ulrich and Scofield. Genotype: *A. powersi* Ulrich and Scofield.
Metoptoma Billings (part), *Geol. Surv. Canada*, *Pal. Fossils*, 1, 1865, p. 39.
Tryblidium Whiteaves (part), *Geol. Surv. Canada*, *Pal. Fossils*, 3, 1884, p. 31.—Whitfield, *Bull. Amer. Mus. Nat. Hist.*, 1 and 2, 1886–9.
Archinacella Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, pp. 821–828.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1909, p. 605.—Berkey, *Amer. Geol.*, 21, 1898, p. 278.
- Archinacella? billingsi*** (Walcott).
Metoptoma billingsi Walcott, 35th *Rep. New York State Mus. Nat. Hist.*, 1884, p. 212, pl. 17, figs. 12, 12a.
Black River (Lowville): Russia, Herkimer County, New York.
- Archinacella canadensis*** (Whiteaves).
Tryblidium Canadense Whiteaves, *Pal. Foss.*, *Geol. Surv. Canada*, 3, pt. 1, 1884, p. 31, pl. 5, figs. 1, 1a.—Lesley, *Geol. Surv. Pennsylvania*, *Rep. P* 4, 1890, p. 1234, text figs.
Capulus Canadensis Whiteaves, *Pal. Foss.*, *Geol. Surv. Canada*, 3, pt. 2, 1895, p. 69, pl. 11, fig. 1.
Archinacella canadensis Ulrich and Scofield *Geol. Minnesota*, 3, pt. 2, 1897, p. 825 (gen. ref.).
Niagaran (Guelph): Hespeler, Ontario.
- Archinacella cingulata*** Ulrich.
Archinacella cingulata Ulrich *Geol. Minnesota*, 3, pt. 2, 1897, p. 829, pl. 61, figs. 1, 2.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1909, p. 606, fig. 805 g, h.
Triblidium cingulatum Miller, *N. A. Geol. Pal.*, 2d App., 1897, p. 771 (gen. ref.).
Trenton (Curdsville): Mercer County, Kentucky.
Holotype.—Cat. No. 45686, U.S.N.M.
- Archinacella clochensis*** Foerste.
Archinacella clochensis Foerste, *Bull. Sci. Lab. Denison Univ.*, 17, 1914, p. 308, pl. 2, figs. 5a–b.
Black River (Lowville): La Cloche Peninsula, Ontario.

***Archinacella deformata* (Hall).**

Orbicula? *deformata* Hall, Pal. New York, 1, 1847, p. 23, pl. 4, figs. 10a, 10b.
(*Orbicula deformis* in explanation of plate.)

Crania? *deformata* Miller, N. A. Geol. Pal., 1889, p. 341.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 150.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 189.

Archinacella? *deformata* Raymond, Amer. Jour. Sci., 4th ser., 20, 1905, p. 375; Ann. Carnegie Mus., 4, 1908, p. 171, pl. 46, figs. 1-6.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 605, fig. 806.

Metoptoma deformis Billings, Geology Canada, 1863, p. 937.

Discina deformis Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 1, fig. 10.

Stenotheca dubia Whitfield and Hovey, Bull. Amer. Mus. Nat. Hist., 11, 1898, p. 58.

Metoptoma dubia Hall, Pal. New York, 1, 1847, p. 23, pl. 4, figs. 11a, 11b.

Chazy (Day Point-Valcour): Crown Point, Valcour Island and Chazy, New York; Aymer, Canada.

***Archinacella deleta* (Sardeson).**

Carinaropsis deleta Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 335, pl. 6, figs. 5, 6.

Archinacella deleta Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 831, pl. 61, figs. 16-20.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 606, fig. 805c-e.

Black River (Decorah): Minneapolis, St. Paul, Cannon Falls, etc., Minnesota.

Plastotype.—Cat. No. 45687, U.S.N.M.

***Archinacella depressa* Ulrich and Scofield.**

Archinacella depressa Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 830, pl. 61, figs. 8 and 9.

Black River (Platteville): Minneapolis, Minnesota.

Plastotype.—Cat. No. 45688, U.S.N.M.

***Archinacella estella* (Billings).**

Metoptoma estella Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 153, fig. 134a, b (advance sheets, 1862); Cat. Sil. Fossils Anticosti, Geol. Surv. Canada, 1866, p. 18 (loc. ref.).

Tryblidium? *estella*, Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1894, p. 31 (gen. ref.).

Archinacella estella Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 829 (gen. ref.).

Richmond (English Head): English Head, Anticosti.

***Archinacella indianensis* (Miller).**

Tryblidium indianense Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1892, p. 695, pl. 14, fig. 14 (adv. sheets, 1891, p. 85).—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 977, pl. 39, fig. 11.

Richmond: Fayette County, Indiana.

Observation.—Compare *Archinacella richmondensis* Ulrich.

***Archinacella instabilis* (Billings).**

Metoptoma instabilis Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 251, fig. 236a, b.

Tryblidium? *instabilis* Whiteaves, Pal. Fossils, Geol. Surv. Canada, 3, pt. 1, 1894, p. 31 (gen. ref.).

Archinacella instabilis Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 829 (gen. ref.).

Chazy (Quebec L): Table Head, Newfoundland.

***Archinacella instabilis incurva* Ulrich and Scofield.**

Archinacella instabilis var. *incurva* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 835, pl. 61, figs. 21-23.

Black River (Decorah): Goodhue County, Minnesota.

Holotype.—Cat. No. 45689, U.S.N.M.

***Archinacella orbiculata* (Hall).**

Carinaropsis orbiculatus Hall, Pal. New York, 1, 1847, p. 306, pl. 83, figs. 8a-c.

Helcion orbiculatus D'Orbigny, Prodr. Pal., 1, 1849, p. 9 (gen. ref.).—Emmons, Amer. Geol., 1, pt. 2, 1855, p. 164.

Archinacella orbiculata Ruedemann, Bull. New York State Mus., 162, 1912, p. 108, pl. 7, figs. 1-6.

Trenton (Snake Hill): Snake Hill, Waterford, etc., New York.

***Archinacella patelliformis* (Hall).**

Carinaropsis patelliformis Hall, Pal. New York, 1, 1847, p. 183, pl. 40, figs. 2a, b.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 314; N. A. Geol. Pal., 1889, p. 400, fig. 659.—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 117, figs.

Helcion patelliformis Emmons, Amer. Geology, 1, pt. 2, 1855, p. 164, pl. 6, fig. 1.—D'Orbigny, Prodr. Pal., 1, 1849, p. 9 (gen. ref.).

Archinacella patelliformis Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 832 (gen. ref.).—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 174, pl. 12, figs. 1, 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 606.

Black River-Maysville: Middleville, etc., New York (Trenton); New Jersey; Ohio; Missouri, etc.

***Archinacella pervalis* (Whitfield).**

Metoptoma pervalis Whitfield, Ann. Rep. Geol. Surv. Wisconsin, 1878, p. 74; Geol. Wisconsin, 4, 1882, p. 211, pl. 5, figs. 13 and 14.

Archinacella pervalis Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 830, pl. 82, figs. 3 and 4.

Metoptoma explanata Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 337, pl. 6, figs. 7, 8.

Black River (Platteville): Minneapolis, Minnesota; Beloit, Wisconsin.

***Archinacella phillipsi* (Walcott).**

Metoptoma phillipsi Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 83, pl. 1, figs. 4, 4a.

Archinacella phillipsi Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 829 (gen. ref.).

Upper Pogonip: Pogonip Ridge, Eureka District, Nevada.

Cotypes.—Cat. No. 17359, U.S.N.M.

***Archinacella pileolum* (Whitfield).**

Triblidium pileolum Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 46, pl. 7, figs. 15-17.

Tryblidium pileolum Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1236, figs.

Archinacella pileolum Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 826 (gen. ref.).

Canadian (Beekmantown): Beekmantown, New York.

***Archinacella powersi* Ulrich and Scofield.**

Archinacella powersi Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 829, pl. 61, figs. 3-5, p. 820, fig. 1a.

Archinacella powersi—Continued.

Triblidium powersi Miller, N. A. Geol. Pal., 2d App., 1897, p. 771 (gen. ref.)

Black River (Platteville): Beloit, Wisconsin.

Plastotype.—Cat. No. 45690, U.S.N.M.

Archinacella? propria Raymond.

Metoptoma montrealensis Raymond (not Billings), Bull. Amer. Pal., 14, 1902, p. 34.

Archinacella? propria Raymond, Ann. Carnegie Mus., 3, 1906, p. 575; 4, 1906, p. 172, pl. 46, figs. 7, 8.

Chazy (Day Point, Crown Point): Crown Point, Valcour Island, and Chazy, New York.

Archinacella pulaskiensis Foerste.

Carinaropsis patelliformis Hull (part), Pal. New York, 1, 1847, p. 306, pl. 83, figs. 7a, b.

Archinacella pulaskiensis Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 309, pl. 3, fig. 3a-d.

Cincinnati (Pulaski): Pulaski, Lorraine, etc., New York.

Archinacella richmondensis Ulrich.

Archinacella richmondensis Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 834, pl. 61, figs. 6, 7.

Richmond (Whitewater): Richmond, Indiana.

Holotype.—Cat. No. 45691, U.S.N.M.

Observation.—Compare *Archinacella indianensis* (Miller).

Archinacella rotunda Ulrich and Scofield.

Archinacella rotunda Ulrich and Schofield, Geol. Minnesota, 3, pt. 2, 1897, p. 835, pl. 61, figs. 24, 25.

Triblidium rotundum Miller, N. A. Geol. Pal., 2d App., 1897, p. 771 (gen. ref.).

Richmond (Maquoketa): Near Graf, Iowa.

Holotype.—Cat. No. 45692, U.S.N.M.

Archinacella rugatina Ulrich.

Archinacella rugatina Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 835, pl. 82, figs. 5, 6.

Richmond (Arnheim): Middletown, Ohio.

Holotype.—Cat. No. 43693, U.S.N.M.

Archinacella semicarinata Ulrich and Scofield.

Archinacella semicarinata Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 833, pl. 61, figs. 12, 13.

Trenton (Prosser): Cannon Falls, Goodhue County, Minnesota.

Holotype.—Cat. No. 43694, U.S.N.M.

Archinacella similis (Whitfield).

Metoptoma similis Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1877, 1878, p. 61; Geol. Wisconsin, 4, 1882, p. 196, pl. 3, figs. 12, 13.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 142, fig.

Tryblidium simile Sardeson, Jour. Geol., 11, 1903, p. 479, fig. 3.

Archinacella similis Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 829 (gen. ref.).

Ozarkian (Mendota): East of Baraboo, Wisconsin.

Archinacella simplex (Billings).

Metoptoma simplex Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 346, fig. 334.

Archinacella simplex—Continued.

Tryblidium simplex Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 31 (gen. ref.).—Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 306, pl. 24, figs. 30, 31.—Seely, Rep. Vermont State Geol., 7, 1910, pl. 62, figs. 30, 31.

Archinacella simplex Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 826 (gen. ref.).

Canadian (Beekmantown): Near Merrickville, Ontario.

Archinacella simulatrix Ulrich and Scofield.

Archinacella simulatrix Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 833, pl. 61, figs. 10, 11.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 606, fig. 805f, i.

Black River (Decorah): St. Paul, Minnesota.

Trenton (Hermitage): Frankfort, Kentucky.

Holotype.—Cat. No. 45695, U.S.N.M.

Archinacella subrotunda Ulrich and Scofield.

Archinacella subrotunda Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 834, pl. 61, figs. 26, 27.

Black River (Decorah): Near Cannon Falls, Minnesota.

Holotype.—Cat. No. 45696, U.S.N.M.

Archinacella trentonensis (Billings).

Metoptoma trentonensis Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 40, fig. 41a, b (adv. sheets, 1862).

Tryblidium? *trentonensis* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 31 (gen. ref.).

Archinacella trentonensis Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 829 (gen. ref.).

Trenton: Chevrotiere and Island of Montreal, Canada.

Archinacella valida (Sardeson).

Tryblidium validum Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 337, pl. 6, figs. 1, 2.

Archinacella valida Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 832, pl. 61, figs. 14, 15.

Trenton (Prosser): Near Cannon Falls and Kenyon, Minnesota.

ARCTINURUS Castelnau.

Genotype: *Paradoxides boltoni* Bigsby.

Arctinurus Castelnau, Essai Syst. Sil. l'Amer. Sept., 1843, p. 21.—Reed, Quart. Jour. Geol. Soc. London, 58, 1902, pp. 60, 63, 73.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 307.

Oncholichas Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 33, 1885, pp. 31, 39.—Koken, Die Leitfossilien, Leipzig, 1896, p. 30.

Platynotus Reed, Quart. Jour. Geol. Soc. London, 58, 1902, pp. 60, 62.

Pterolichas Gurich, Neues Jahrb. f. Minn., Geol. Pal., Beilage-Band, 14, 1901, p. 528, pl. 20, fig. 2.—Reed, Quart. Jour. Geol. Soc. London, 58, 1902, pp. 62, 73.

Arctinurus boltoni (Bigsby).

Paradoxides boltoni Bigsby, Jour. Acad. Nat. Sci. Philadelphia, 1st ser., 4, pt. 2, 1825, p. 365, pl. 23.—Green, Mon. Tril. N. A., 1832, p. 60, pl. 1, fig. 5.—Harlan, Trans. Geol. Soc. Pennsylvania, pt. 1, 1834, p. 103.

Arctinurus boltoni Castelnau, Essai Syst. Sil. l'Amer. Sept., 1843, p. 21, pl. 3, fig. 2.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 307, fig. 1618.

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***Arctinurus boltoni*—Continued.**

- Platynotus boltoni* Conrad, Rep. New York State Geol. Surv., 1838, p. 118.—Hall, Geol. New York, pt. 4, Tab. Org. Rem., 1843, p. 19, fig. 1.
- Lichas boltoni* Hall, Pal. New York, 2, 1852, p. 311, pl. 69; pl. 70, figs. 1a-g, j-l (not figs. 1h-i).—Gebhard, 8th Rep. New York State Cab. Nat. Hist., 1855, p. 29, pl. 69, fig. 1.—Meek and Worthen, Geol. Surv. Illinois, 6, 1875, p. 508, pl. 25, fig. 5.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 336, fig.—Clarke, 10th Rep. State Geol. New York, 1891, p. 88; 44th Rep. New York State Mus., 1892, p. 112.—Keyes, Missouri Geol. Surv., 4, 1894, p. 226.—Grabau, Bull. New York State Mus., 45, 1901, p. 225, pl. 17.
- Lichas (Oncholichas) boltoni* Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 33, 1885, p. 31.
- Pterolichas boltoni* Gurich, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 14, 1901, p. 528, pl. 20, fig. 2.
- Clinton (Rochester): Lockport, Rochester, etc., New York; Grimsby, Hamilton, etc., Ontario.
- Plastotype*.—Cat. No. 4888, U.S.N.M.

***Arctinurus chicagoensis* Weller.**

- Arctinurus chicagoensis* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 248, pl. 23, figs. 7, 8; pl. 22, fig. 14.
- Niagaran (Racine): Hawthorne, Illinois.

***Arctinurus harrisi* (Miller).**

- Lichas harrisi* Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 106, pl. 3, fig. 9.
- Lichas (Platynotus) harrisi* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 753.
- Richmond (Liberty): Near Waynesville, Ohio.
- Holotype*.—Cat. No. 40690, U.S.N.M.

***Arctinurus nereus* (Hall).**

- Lichas boltoni* Hall, Pal. New York, 2, 1852, p. 311, pl. 70, figs. 1h-i (not figs. 1a-g, j-l).
- Lichas nereus* Hall, 16th Rep. New York State Cab. Nat. Hist., 1863, p. 226.—Van Ingen, School of Mines Quart., 23, 1901, p. 64, pl. figs. 14-26.
- Arctinurus nereus* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 308.
- Niagaran: Lockport, New York (Rochester); St. Clair Springs, Independence County, Arkansas (St. Clair).

***Arctinurus obivus* (Hall).**

- Lichas obivus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1870 (rev. ed.), p. 424, pl. 25, fig. 10.
- Lichas (Oncholichas) obvia* Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 33, 1885, p. 31.
- Niagaran: Lyons, Iowa.

***Arctinurus occidentalis* (Hall).**

- Lichas boltoni* Worthen and Meek, Geol. Surv. Illinois, 6, 1875, p. 508, pl. 25, fig. 5.
- Lichas boltoni* var. *occidentalis* Hall, Trans. Albany Inst., 4, 1864, p. 223; 28th Rep. New York State Mus. Nat. Hist. (doc. ed.), 1877, pl. 34, figs. 8-11; (mus. ed.), 1879, p. 198, pl. 34, figs. 8-11; 11th Rep. Dep. Geol. Nat. Hist. Indiana, 1882, p. 344, pl. 36, figs. 8-11, 12.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 335, fig.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 272.
- Arctinurus occidentalis* Weller, Bull. Chicago Acad. Sci., Nat. Hist., Surv., 4, pt. 2, 1907, p. 247, pl. 20, figs. 10-12.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 308, fig. 1621a.

Arethinurus occidentalis—Continued.

Niagaran: Waldron, Indiana, and Newsom, Tennessee (Waldron); Grafton, Joliet, and Bonfield, Illinois; Cumberland Gap, Tennessee (Clinton).

ARENICOLA SALTER. See *Arenicolites* Salter.**ARENICOLITES** Salter.

Genotype: *Arenicola didyma* Salter.

Arenicola Salter (not Leach), Quart. Jour. Geol. Soc. London, 12, 1856, p. 248.

Arenicolites Salter, Quart. Jour. Geol. Soc. London, 13, 1857, p. 204.—Nathorst.

Kongl. Sven. Vet.-Akad. Handl., 18, No. 7, 1881, p. 49.—Whitfield, Geol.

Wisconsin, 4, 1882, p. 177.—Miller, N. A. Geol. Pal., 1889, p. 517.

ARENICOLITES (SCOLITHUS) LINEARIS. See *Scolithus linearis*.**Arenicolites sparsus** Salter.

Arenicolites sparsus Salter, Quart. Jour. Geol. Soc. London, 13, 1857, p. 203.—

Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 138.—Nicholson,

Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 41, fig. 17.

Silurian: Europe; Dundas, Ontario (Cataract).

ARETHUSINA Barrande.

Genotype: *Arethusa koninckii* Barrande.

Arethusa Barrande, Notice Prel., Syst. Sil. Boheme, 1846, p. 48.

Arethusina Barrande, Neues Jahrb. f. Min., etc., 1850, p. 780; Syst. Sil. du Centre

Boheme, 1, 1852, p. 493.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 498.—

Barrande, Neues Jahrb. f. Min., Geol. Pal., 1868, p. 257.—Ehlert, Bull. Soc.

d'Etudes Sci. d'Angers, 1885, p. 4.—Zittel, Handb. Pal., 2, 1885, p. 624.—

Beecher, Amer. Jour. Sci., 3d ser., 46, 1893, p. 143; Amer. Geol., 16, 1895,

pp. 167, 176.—Koken, Die Leitfossilien, Leipzig, 1896, p. 24.—Lindstrom,

Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, p. 32.

Arethusina americana Walcott.

Arethusina americana Walcott, Mono. U. S. Geol. Surv., 8, 1884, p. 62, pl. 9,

fig. 27.—Brogger, Geol. Foren. Stockholm Forhandl., 8, 1886, p. 206.

Harpides? americanus Frech, Leth. geog., Th. 1, Leth. Pal., 2, 1897, p. 44, footnote.

Cambrian and ?Ordovician (Pogonip): Eureka District, Nevada.

Arethusina argentina Kayser.

Arethusina argentina Kayser, Beitr. Geol. Pal. Argentinischen Republik, Palaeon-

tographica Suppl., 3, 1876, p. 12, pl. 2, fig. 2.

Ordovician: Quebrada de la Laja, Argentina.

ARGASTER Hall. See *Mesopaleaster* Schuchert.**ARGES ARKANSANA** Van Ingen. See *Dicranopeltis arkansana*.**ARGES PHLYCTAINODES** Hall. See *Corydocephalus phlyctainodes*.**ARGES PHLYCTAINODES DEPAUPERATUS** Van Ingen. See *Corydocephalus depauperatus*.**ARGES TUBERCULATUS** Weller. See *Corydocephalus tuberculatus*.**ARIONELLUS** Barrande.

Genotype: *A. ceticephalus* Barrande.

Arionellus Barrande, Neues Jahrb. f. Min., etc., 1850, p. 779; Syst. Sil. du Centre

Boheme, 1, 1852, p. 404, pl. 10.—Pictet, Traite de Pal., 2d ed., 1854, 2, p. 491.—

Billings, Canadian Nat. Geol., 5, 1860, p. 313; Pal. Foss., 1, Geol. Surv.

Canada, 1865, p. 405.—Kayser, Beitr. Geol. Pal., Argentinischen Republik,

Palaeontographica Suppl., 3, 1876, p. 7.—Walcott, Science, 3, 1884, p. 281.—

ARIONELLUS—Continued.

Zittel, Handb. Pal., 2, 1885, p. 601.—Koken, Die Leitfossilien, Leipzig, 1896, p. 21, fig. 13, figs. 5, 6.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, pp. 22, 25.

Arionellus? cylindricus Billings.

Arionellus cylindricus Billings, Canadian Nat. Geol., 5, 1860, p. 314, fig. 14; Geol. Canada, Geol. Surv. Canada, 1863, p. 237, fig. 264; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 406, fig. 385.

Ptychaspis cylindricus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 198.

Agraulos cylindricus Miller, N. A. Geol. Pal., 1889, p. 527, fig. 955.

Ozarkian? (*Levis-erratic*): Point Levis, Quebec.

ARIONELLUS OWENI Meek and Hayden. See *Ptychoparia oweni*.

ARIONELLUS PUSTULATUS Walcott. See *Glaphurus pustulatus*.

Arionellus? subclavatus Billings.

Arionellus subclavatus Billings, Canadian Nat. Geol., 5, p. 315, fig. 15; Geol. Canada, Geol. Surv. Canada, 1863, p. 237, fig. 265a, b; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 406, fig. 386a.

Ptychaspis subclavatus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 198.

Ozarkian? (*Levis-erratic*): Point Levis, Quebec.

ARISTERELLA Ulrich.

Genotype: *A. nitidula* Ulrich.

Aristerella, Ulrich Geol. Minnesota, 3, pt. 2, 1894, p. 524.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 779.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 518.

Aristerella nitidula Ulrich.

Aristerella nitidula Ulrich Geol. Minnesota, 3, pt. 2, 1894, p. 524, pl. 35, figs. 30-39.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 518, fig. 696c, d, e.

Black River: Chatfield, Minnesota (Decorah); Lincoln County, Missouri (Auburn).

Cotypes.—Cat. No. 46092, 46093, U.S.N.M.

Aristophycus Miller and Dyer.

Genotype: *A. ramosum* Miller and Dyer.

Aristophycus Miller and Dyer, Contr. to Pal. No. 2, 1878, p. 3.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 130.—Miller, N. A. Geol. Pal., 1889, p. 107.

Observation.—Genus and species abandoned by author in 1889, as probably inorganic and, if fucoidal, too irregular and too little known to be retained.

Aristophycus ramosum Miller and Dyer.

Aristophycus ramosum Miller and Dyer, Contr. to Pal., No. 2, 1878, p. 4, pl. 4, fig. 2.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 130, pl. 6, fig. 2; 14, 1891, p. 46.—Miller, N. A. Geol. Pal., 1, 1889, p. 107.

Maysville: Cincinnati, Ohio.

Aristophycus ramosum germanum Miller and Dyer.

Aristophycus ramosum var. *germanum* Miller and Dyer, Contr. to Pal., No. 2, 1878, p. 4, pl. 4, fig. 3.—Miller, N. A. Geol. Pal., 1889, p. 130.—James, Jour. Cincinnati Soc. Nat. Hist., 1891, 14, p. 46.

Maysville: Cincinnati, Ohio.

ARISTOZOE Barrande.

Genotype: *A. bisulcata* Barrande.

Aristozoe Barrande, Syst. Sil. Boheme, Sup. 1, 1872, p. 474.—Canu, Ann. Soc. geol. du Nord, 12, 1885, p. 145.—Jones Rep. 53d Meeting Brit. Assoc. Adv. Sci., 1884, p. 217; 55th Meeting, 1886, p. 358.—Zittel, Handb. d. Pal., 2,

ARISTOZOE—Continued.

Munich, 1885, p. 552.—Novak, Sitz. d. k. bohm. Gesell. d. Wiss. Math.-Naturw. Cl., 1886, p. 239.—Jones and Woodward, Mon. Brit. Pal. Phyllopoda, Pal. Soc., 1888, p. 3.—Whidborne, Mon. Dev. Fauna South England, 1, Pal. Soc., 1889, p. 42.—Miller, N. A. Geol. Pal., 1889, p. 530.—Koken, Die Leitfossilien, Leipzig, 1896, p. 40.

Aristozoe canadensis Whitfield.

Aristozoe canadensis Whitfield, Ann. New York Acad. Sci., 1890, p. 505; 5, 1891, p. 572, pl. 12, figs. 17, 18; Geol. Surv. Ohio, Pal., 7, 1893, p. 462, pl. 8, figs. 17, 18.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 379, fig. 1680e, f.

Trenton: Ottawa Basin, Ontario.

ARTHREARIA Billings.

Genotype: *A. antiquata* Billings.

Arthrearia Billings, Canadian Nat., n. s., 6, 1872, p. 467; Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 66; Geol. Surv. Newfoundland, Rep. Progr. for 1881, 1882, App. p. 14.—Miller, N. A. Geol. Pal., 1889, p. 107.

Arthrearia biclavata Miller.

Arthrearia biclavata Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 354, fig. 26. Maysville: Cincinnati, Ohio, and vicinity.

ARTHROCLEMA Billings.

Genotype: *A. pulchellum* Billings.

Arthroclema Billings, Pal. Foss., 1, 1865, p. 54 (adv. sheets, 1862).—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 151; 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 60; Amer. Geol., 1, 1888, p. 232.—Miller, N. A. Geol. Pal., 1889, p. 293.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 192; Geol. Surv. Illinois, 8, 1890, p. 400; Geol. Minnesota, 3, 1893, p. 197; Zittel's Textb. Pal., 1896, p. 281.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 546.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 5.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 42.—Cummings, Amer. Jour. Sci., 4th ser., 17, 1904, p. 75, fig. 83; 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 739.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 152.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 150; Zittel-Eastman Textb. Pal., 1913, p. 343.

Arthroclema angulare Ulrich.

Arthroclema angulare Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 45; Geol. Surv. Illinois, 8, 1890, p. 641, pl. 29, figs. 6-6b.—Whiteaves, Pal. Foss., 3, 1895, p. 117.

Richmond: Wilmington, Illinois (Fernvale); Stony Mountain, Manitoba (Stony Mountain); English Head, etc., Anticosti (English Head and Charleton).

Arthroclema armatum Ulrich.

Arthroclema armatum Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 194, fig. 19a-d (not e-h); Geol. Minnesota, 3, 1893, p. 201, pl. 2, figs. 8-11, 25, 28-33, pl. 3, fig. 7.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 547, fig. 111.—Sardeson, Jour. Geol., 9, 1901, p. 161.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 153, fig. 2051.—Bassler, Bull. U. S. Nat. Mus. No. 77, 1911, pp. 151, 152, fig. 73.

Trenton (Prosser): Cannon Falls and St. Paul, Minnesota.

Ordovician (Glauconite limestone): Reval, Esthonia, Russia.

Cotypes.—Cat. No. 43633, U.S.N.M.

ARTHROCLEMA ARMATUM Ulrich (part). See *Arthroclema pulchellum*.

Arthroclema billingsi Ulrich.

Arthroclema billingsi Ulrich, Geol. Surv. Illinois, 8, 1890, p. 642; Geol. Minnesota, 3, 1893, p. 197, pl. 2, fig. 7.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 547, fig. 105.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 153, fig. 205k.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 343, fig. 501a.

Trenton: Ottawa, Ontario.

Holotype.—Cat. No. 43415, U.S.N.M.

Arthroclema cornutum Ulrich.

Arthroclema cornutum Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 193, fig. 18; Geol. Minnesota, 3, 1893, p. 200, pl. 2, figs. 16–21, 23, pl. 3, fig. 34.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 547, figs. 106–108, 112.

Black River (Decorah): Minneapolis, Minnesota.

Cotypes.—Cat. No. 43634, U.S.N.M.

Arthroclema pulchellum Billings.

Arthroclema pulchellum Billings, Pal. Foss., 1, 1865, p. 54, fig. 60 (adv. sheets, 1862); Geol. Canada, Geol. Surv. Canada, 1863, p. 157, fig. 119.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 642, pl. 29, fig. 6c; Geol. Minnesota, 3, 1893, pl. 2, figs. 12–15.

Arthroclema armatum (part) Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 194, fig. 19e–h (not 19a–d).

Trenton: Ottawa, Ontario.

ARTHROCLEMA SPINIFORME Ulrich. See *Helopora spiniformis*.

Arthroclema striatum Ulrich.

Arthroclema striatum Ulrich, Geol. Minnesota, 3, 1893, p. 198, pl. 2, figs. 22, 24, pl. 3, figs. 28–33.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 547, figs. 109, 110.

Black River (Decorah): Minneapolis and St. Paul, Minnesota.

Cotypes.—Cat. No. 43498, U.S.N.M.

ARTHRONEMA Ulrich. See *Arthrostylus* Ulrich.

ARTHROPHYCUS Hall.

Genotype: *Fucoides harlani* Conrad.

Arthropycus Hall, Pal., New York, 2, 1852, p. 4.—Dawson, Canadian Nat. and Geol., n. s., 1, 1864, p. 366.—Nathorst, Kongl. Sven. Vet.-Akad. Handl., 18, No. 7, 1881, pp. 32, 86.—James, Jour. Cincinnati Soc. Nat. Hist., 16, 1893, p. 82; Proc. Amer. Assoc. Adv. Sci., 42, 1894, p. 172.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 132; Bull. New York State Mus., 9, 1901, p. 132.—Sarle, Proc. Rochester Acad. Sci., 4, 1906, p. 203.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 247.

Harlania Goeppert, Zeits. d. d. Geol. Gesell., 3, 1851, p. 189.—Roemer, Leth. geog., 1 Theil, Leth. Pal., Erste Lief., 1880, p. 135.—Nathorst, Kongl. Sven. Vet.-Akad. Handl., 21, No. 14, 1886, p. 32.

Arthropycus alleghaniensis (Harlan).

Fucoides alleghaniensis Harlan, Jour. Acad. Nat. Sci., 6, 1831, p. 289, pl. 15.—Taylor Trans. Geol. Soc. Pennsylvania, 1, 1834, p. 5.—Harlan, Medical and Physical Researches, 1835, p. 393, fig. 1 on plate.—Unger, Gen. et Sp. Foss. Plants, 1850, p. 30.

Arthropycus alleghaniensis James, Jour. Cincinnati Soc. Nat. Hist., 16, 1893, p. 86.—Proc. Amer. Assoc. Adv. Sci., 42, 1894, p. 172.—Sarle, Proc. Rochester Acad. Sci., 4, 1906, p. 203.—Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, pl. 8, fig. 4.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 247.

Arthropycus alleghaniensis—Continued.

Fucoides harlani Conrad, 2d Ann. Rep. New York Geol. Surv., 1838, p. 113.—Vanuxem, Nat. Hist. New York, Geol. 3, 1842, p. 71, fig. 10.—Hall, Nat. Hist. New York, Geol., 4, 1843, p. 46, figs. 1, 2; tab. ill. 1, figs. 1, 2.—Owen, Amer. Jour. Sci. Arts, 48, 1845, p. 299, figs. 1, 2.—Hall, Pal. New York, 2, 1852, p. 5, pl. 1, fig. 1; pl. 2, figs. 1a-c.

Arthropycus harlani Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 821, fig. 623.—Emmons, Manual Geol., 1860, p. 105, fig. 95.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 52, pl. 5, figs. 10, 11.—Chapman, Canadian Jour., n. s., 8, 1863, p. 209, fig. 211; Expos. Min. Geol. Canada, 1864, p. 181, fig. 211.—Whiteaves, Trans. Royal Soc. Canada, 1, sec. 4, 1883, p. 110.—Lesley, Geol. Surv. Pennsylvania Rep. P 4, 1889, p. 37-39, figs.—James, Jour. Cincinnati Soc. Nat. Hist., 16, 1893, pp. 82-86; Proc. Amer. Assoc. Adv. Sci., 42, 1894, p. 172.—Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 3.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 132, pl. 16; Bull. New York State Mus., 45, 1901, p. 132, pl. 16.

Crinocoma antiqua Castelnau, Syst. Sil., 1843, p. 50, pl. 25, fig. 1.

Encrinurus giganteus Eaton, Geol. Textbook, 2d ed., 1832, p. 37, pl. 1, fig. 8.

Harlania Hallii Goepfert, Nov. Act. Acad. Caes. Leop., 22, 1852, Suppl. (Ueberganggeb., p. 98, pl. 41, fig. 4); Zeits. d. d. geol. Gesell., 3, 1852, pp. 189, 205; Saprota Le Monde des Plantes Appar. Homme, Paris, 1879, p. 164, figs. 1, 2.—Schimper, Pal. Veg., 1, 1869, p. 196, pl. 2, fig. 6.—Roemer, Leth. Geog., 1, Pal., 1880, p. 135, fig. 4.—Lesquereux, 13th Ann. Rep. Indiana Geol. Surv., 1883, p. 29, pl. 2, fig. 3.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 272, fig.—James, Proc. Amer. Assoc. Adv. Sci., 42, 1894, p. 172.—Dana, Man. Geol., New York, 4th ed., 1895, p. 545, fig. 744.—Nathorst, Forh. Geol. Foren. Stockholm, 19, pt. 5, 1897, p. 364, pl. 5.

Fucoides Brongniartii Harlan, Featherstonhaugh's Monthly Amer. Jour. Geol., 1, 1832, p. 307.—Taylor, Trans. Geol. Soc. Pennsylvania, 1, 1834, p. 14, pl. 3, fig. 6.—Harlan, Medical, Physical Res., 1835, p. 398, pl. —, fig. 2.—Conrad 1st Ann. Rep. New York Geol. Surv., 1837, p. 168.

Top of White Medina (Tuscarora, Clinch, etc.): Mifflin County, etc., Pennsylvania; New York; Ontario; Maryland; Virginia.

ARTHROPHYCUS HARLANI Rogers. See *Arthropycus alleghaniensis*.

ARTHROPOREA Ulrich. Genotype: *Ptilodictya* (*Stictopora*) *shafferi* Meek.

Arthropora Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, pp. 152, 167.—Miller, N. A. Geol. Pal., 1889, p. 293.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 393; Geol. Minnesota, 3, 1893, p. 176; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 279.—Pocta, Syst. Sil. Centre Boheme, 8, 1894, pt. 2, p. 14.—Simpson, 14th Ann. Rep. State. Geologist New York for the year 1894, 1897, p. 605.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 46.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 156.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 739.—Bassler, Bull. U. S. Nat. Mus., No. 77, 1911, p. 119; Zittel-Eastman Textb. Pal., 1913, p. 345.

Arthropora bifurcata Ulrich.

Arthropora bifurcata Ulrich, Geol. Minnesota, 3, 1893, p. 178, pl. 14, figs. 22-25.

Black River (Decorah): St. Paul and Cannon Falls, Minnesota.

Trenton: Minnesota, Kentucky, Tennessee, and Canada.

Cotypes.—Cat. No. 43504, U.S.N.M.

Arthropora cincinnatiensis (James).

Ptilodictya? *cincinnatiensis* James, Paleontologist, No. 5, 1881, p. 39.

Arthropora cincinnatiensis Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 14, pl. 4, fig. 7.

Maysville (Mount Hope): Cincinnati, Ohio, and vicinity.

Arthropora cleavelandi (James).

Ptilodictya cleavelandi James, Paleontologist, No. 5, 1881, p. 38.

Ptilodictya grahami James, Paleontologist, No. 5, 1881, p. 39.

Ptilodictya dubia James, Paleontologist, No. 5, 1881, p. 40.

Arthropora shafferi-cleavelandi Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 171.

Arthropora cleavelandi Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 14, pl. 3, figs. 13-16; pl. 4, fig. 6.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 766, pl. 26, fig. 10.

Eden: Cincinnati, Ohio, and vicinity.

Arthropora kentuckyensis (James).

Ptilodictya kentuckyensis James, Paleontologist, No. 5, 1881, p. 38.

Arthropora kentuckyensis Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 15, pl. 4, fig. 5.

Trenton (Upper): Ohio River bank opposite Cincinnati, Ohio.

Arthropora reversa Ulrich.

Arthropora reversa Ulrich, Geol. Minnesota, 3, 1893, p. 178, pl. 14, fig. 26.

Trenton (Prosser): St. Paul, Minnesota.

Holotype.—Cat. No. 43502 U.S.N.M.

Arthropora shafferi (Meek).

Ptilodictya (*Stictopora*) *Shafferi* Meek, Proc. Acad. Nat. Sci. Philadelphia, 1872, p. 317; Pal. Ohio, 1, 1873, p. 69, pl. 5, figs. 1a-c.

Ptilodictya shafferi Nicholson, Pal. Prov. Ontario, 1875, p. 33, fig. 4.

Stictopora shafferi Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1069, figs.

Arthropora shafferi Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 167, pl. 7, figs. 10, 10a.—Miller, N. A. Geol. Pal., 1889, p. 293, figs. 453-455.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 308, fig. 3e.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 157.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 171.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1906, p. 767, pl. 26, fig. 9.

Crateripora erecta Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 29, pl. 7, figs. 29, 29a; 5, 1882, p. 151.

Stromatopora (?) *lichenoides* James, Paleontologist, No. 3, 1879, p. 18; Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 251; 15, 1892, pt. 3, p. 90.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 56.

Maysville (Bellevue, Corryville): Cincinnati, Ohio, and many localities in Ohio, Indiana, Kentucky, and Tennessee.

Plesiotypes.—Cat. Nos. 43630, 43646 U.S.N.M.

ARTHROPORA SHAFFERI-CLEAVELANDI Nickles and Bassler. See *Arthropora cleavelandi*.

Arthropora simplex Ulrich.

Arthropora simplex Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 65; Geol. Minnesota, 3, 1893, p. 177, pl. 14, figs. 12-21.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 157, fig. 208g.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 120, 121, fig. 16.

Black River (Decorah): Minneapolis, St. Paul, etc., Minnesota; Decorah, Iowa, Ordovician (Wassaleum): Uxnorm, Esthonia, Russia.

Cotypes.—Cat. No. 43503, U.S.N.M.

ARTHROBACHIS Hawle and Corda.

Genotype: *Battus tardus* Barrande.

Arthrorhachis Hawle and Corda, Abh. d. k. böhmischen Gesell. d. Wiss., 5 (extract), 1847, p. 114, pl. 6, fig. 60.—Raymond, Ottawa Naturalist, 26, 1913, p. 3.

Arthrorhachis galba (Billings).

- Agnostus Galba* Billings, *Pal. Foss.*, 1, Geol. Surv. Canada, 1865, p. 297, fig. 288.—Vogdes, *Amer. Geol.*, 9, 1892, p. 395, pl. 9, fig. 6.—Bassler, *Bull. Geol. Surv. Virginia*, 2a, 1909, p. 111, figs. 10, 2-5.
- Chazyan: Table Head, Pistolet Bay, and four miles northeast of Portland Creek, Newfoundland (Quebec—M, N, P); Lexington, Virginia (Liberty Hall).

ARTHROSTYLUS Ulrich.Genotype: *Helopora tenuis* James.

- Arthronema* (preoccupied) Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, pp. 151, 160; Pocta, *Syst. Sil. Centre Boheme*, 8, pt. 1, 1894, p. 14.
- Arthrostylus* Ulrich, *American Geologist*, 1, 1888, p. 230.—Miller, *N. A. Geol. Pal.*, 1889, p. 293.—Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 12, 1890, p. 188; *Geol. Surv. Illinois*, 8, 1890, p. 400; *Geol. Minnesota*, 3, 1893, p. 187; Zittel's *Textb. Pal. (Engl. ed.)*, 1896, p. 280.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 527.—Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 42.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 152.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 740.—Bassler, *Bull. U. S. Nat. Mus.*, 77, 1911, p. 147; Zittel-Eastman *Textb. Pal.*, 1913, p. 342.

Arthrostylus conjunctus Ulrich.

- Arthrostylus conjunctus* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 12, 1890, p. 189, fig. 14; *Geol. Minnesota*, 3, 1893, p. 188, pl. 3, figs. 13, 14.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 526, figs. 78, 79, 79a.—Bassler, *Bull. U. S. Nat. Mus.*, 77, 1911, pp. 147, 148, fig. 70; Zittel-Eastman *Textb. Pal.*, 1913, p. 343, fig. 501d, e.
- Black River (Decorah): Near Fountain, Minnesota.
- Ordovician (Waasaleem): Uxnorn, Esthonia, Russia.
- Holotype*.—Cat. No. 43636, U.S.N.M.

Arthrostylus curtus (Ulrich).

- Arthronema curtum* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 161, pl. 6, fig. 9.
- Arthrostylus curtus* Miller, *N. A. Geol. Pal.*, 1889, p. 293.—Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 171.
- Maysville (Mount Hope): Covington, Kentucky.
- Holotype*.—Cat. No. 43639, U.S.N.M.
- Observation.—Probably the basal segment of some species of *Arthropora*.

Arthrostylus obliquus Ulrich.

- Arthrostylus obliquus* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 12, 1890, p. 190, figs. 14c, d; *Geol. Minnesota*, 3, 1893, p. 188, pl. 3, figs. 15, 16.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 152, fig. 205i.—Bassler, *Bull. U. S. Nat. Mus.*, 77, 1911, p. 148, fig. 71.
- Black River (Decorah): Minneapolis, Minnesota.
- Ordovician (Echinospherites limestone): Wolchow River, St. Petersburg, Russia.
- Holotype*.—Cat. No. 43639, U.S.N.M.

Arthrostylus tenuis (James).

- Helopora tenuis* James, *Paleontologist*, No. 1, 1873, p. 3.
- Arthronema tenuis* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 160, pl. 6, figs. 8-8c.
- Arthrostylus tenuis* Ulrich, *Geol. Minnesota*, 3, 1893, pl. 3, fig. 16e; *Jour. Cincinnati Soc. Nat. Hist.*, 12, 1890, pp. 189, 190, figs. 14e, f.—Bassler, *Proc. U. S. Nat. Mus.*, 30, 1906, p. 15.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 768, pl. 26, figs. 8-8c.

Arthrostylus tenuis—Continued.

Trenton (Upper) and Eden: Cincinnati, Ohio, and vicinity; Indiana and Kentucky; New York (Indian Ladder).

Plesiotypes.—Cat. No. 43637, U.S.N.M.

ASAPHELLUS Callaway.

Genotype: *Asaphus homfrayi* Salter.

Asaphellus Callaway, Quart. Jour. Geol. Soc. London, 33, 1877, p. 663.—Zittel, Handb. Pal., 2, 1885, p. 609.—Raymond, Ann. Carnegie Mus., 7, No. 1, 1910, p. 37; Zittel-Eastman Textb. Pal., 1913, p. 719.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 290.

Asaphellus gyracanthus Raymond.

Asaphus canalis? Cleland, Bull. Amer. Pal., 3, 1900, p. 128, pl. 16, figs. 7, 8; 4, 1903, p. 38.

Isotelus canalis Weller, Pal. New Jersey, 3, 1902, p. 132, pl. 5, figs. 5, 6.

Asaphellus gyracanthus Raymond, Ann. Carnegie Mus., 7, No. 1, 1910, p. 39, pl. 14, figs. 5-7.

Canadian (Beekmantown): Fort Hunter, New York (Tribes Hill), and Columbia, New Jersey.

Asaphellus homfrayi (Salter).

Asaphus Homfrayi Salter, App. Ramsay Geol. N. Wales; Mem. Geol. Surv., 3, 1866, p. 311, pl. 8, figs. 11-14; Mem. Geol. Surv. Great Britain, 3, 1881, 2d ed., p. 506, pl. 8, figs. 11-14.

Asaphus (*Isotelus*) *Homfrayi* Salter, Mon. British Tril., Pal. Soc., 1866, p. 165, pl. 24, figs. 6-12; Cat. Camb. and Sil. Foss., 1873, p. 17.

Asaphus (*Asaphellus*) *Homfrayi* Callaway, Quart. Jour. Geol. Soc. London, 33, 1877, p. 663, pl. 24, fig. 1.

Asaphellus Homfrayi var. *Matthew*, Bull. Nat. Hist. Soc. New Brunswick, 20, 1902, p. 413, pl. 18, figs. 10a-e; Rep. Cambrian Rocks Cape Breton, Geol. Surv. Canada, 1903, p. 232, pl. 18, figs. 10a-e.

Asaphellus Homfrayi, var. *macropyga* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 290, fig. 1598.

Lower Ordovician: Europe; McLeod Brook, near Boisdale, Cape Breton, Nova Scotia (Bretonian—Div. C 3c2).

ASAPHELLUS PLANUS Matthews. See *Hemigyraspis plana*.**ASAPHOCRINUS** Springer.

Genotype: *A. bassleri* Springer.

Asaphocrinus Springer, Mon. Crin. Flex., Smiths. Inst. (in press).

Asaphocrinus bassleri Springer.

Asaphocrinus bassleri Springer, Mon. Crin. Flex., Smiths. Inst. (in press).

Niagaran (Brownsport): Decatur County, Tennessee.

Asaphocrinus incisus (Ringueberg).

Lecanocrinus incisus Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, No. 1, 1886, p. 10, pl. 1, fig. 6.

Asaphocrinus incisus Springer, Mon. Crin. Flex., Smiths. Inst. (in press).

Clinton (Rochester): Lockport, New York.

Asaphocrinus ornatus (Hall).

Cyathocrinus? Hall, Nat. Hist. New York, Geol. 4th Dist., 2, 1843, p. 201, pl. 44, figs. 2a-m.

Lecanocrinus ornatus Hall, Pal. New York, 2, 1852, p. 201, pl. 44, figs. 2a-m.

Asaphocrinus ornatus Springer, Mon. Crin. Flex., Smiths. Inst. (in press).

Lecanocrinus nitidus Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, No. 1, 1886, p. 9, pl. 1, fig. 5.

Lecanocrinus excavatus Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, No. 1, 1886, p. 11, pl. 1, fig. 7.

Clinton (Rochester): Lockport, New York.

ASAPHOIDICHNUS Miller.Genotype: *A. trifidus* Miller.

Asaphoidichnus Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1880, pp. 217, 218;
N. A. Geol. Pal., 1889, p. 530.

Asaphoidichnus dyeri Miller.

Asaphoidichnus dyeri Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1880, p. 219,
pl. 13, fig. 1.—Nathorst, Kongl. Sven. Vet.-Akad. Handl., 18, No. 7, 1881,
p. 48.

Eden (Economy): Cincinnati, Ohio.

Asaphoidichnus trifidus Miller.

Asaphoidichnus trifidus Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1880, p. 218;
N. A. Geol. Pal., 1889, p. 530, fig. 966.

Eden (Economy): Cincinnati, Ohio.

ASAPHUS Brongniart. Genotype: *Entomolithus paradoxus expansus* Linnaeus.

Asaphus Brongniart, Hist. Nat. Crust. Foss., 1822, p. 17.—DeKay, Annals Lyceum
Nat. Hist., New York, 1, 1824, p. 175 footnote.—Dalman, Kongl. Vet.-Akad.
Handl. for 1826, 1827, pp. 149, 235, 268.—Dalman-Engelhart, Die Palaeaden,
Nurnberg, 1828, pp. 32, 41.—Eichwald, Zool. Specialis, pt. 2, Vilnae, 1830,
p. 114.—Fischer de Waldheim, Oryctographie de Moscou, 1830-1837, p. 121.—
Eaton, Geol. Textb., 2d ed., 1832, p. 31.—Green, Mon. Tril. N. A., 1832, pp.
16, 43.—Murchison, Sil. Syst., 1839, p. 654.—Edwards, Hist. Nat. d. Crus-
taces, 3, 1840, p. 305.—Burmeister, Org. der Tril., Berlin, 1843, p. 122.—
Portlock, Rep. Geol. Londonderry, 1843, pp. 274, 292.—Goldfuss, Neues
Jahrb. f. Min., etc., 1843, pp. 541, 560.—Emmrich, ibid., 1845, p. 41.—
Loven, Ofvers, Kongl. Vet.-Akad. Forhandl., 2, 1845, p. 50.—Burmeister,
Org. Tril., London, 1846, pp. 105, 108.—Hawle and Corda, Abh. d. k. bohmischen
Gesell. d. Wiss., 5 (extract), 1847, p. 68, pl. 4, fig. 38.—Salter, Mem.
Geol. Surv. United Kingdom, dec. 2, 1849, pl. 5.—McCoy, Ann. Mag. Nat.
Hist., ser. 2, 4, 1849, p. 399.—Barrande, Neues Jahrb. f. Min., etc., 1850, p.
778; Syst. Sil. du. Centre Boheme, 1, 1852, p. 643.—Pictet, Traite de Pal.,
2d ed., 2, 1854, p. 511.—McCoy, British Pal. Rocks and Foss., 1854, p. 169.—
Nieszkowski, Archiv. für die Naturk. Liv.-Ehstund Kurl., 1st ser., 1, 1857,
p. 545.—Chapman, Canadian Jour., n. s., 8, 1863, p. 28; Expos. Min. and Geol.
Canada, 1864, p. 136.—Salter, Mem. Geol. Surv. United Kingdom, dec. 11,
1864, pl. 3; Mon. Brit. Tril., Pal. Soc. 1866, p. 145.—Woodward, Canadian
Nat., n. s., 6, 1871, p. 228.—Miller, Cincinnati Quart. Jour. Sci., 1874, pp.
135, 136.—Angelin, Pal. Scandinavica, 3d ed., Holmiae, 1878, p. 51.—Novak,
Sitz. d. k. bohm. Gesell. d. Wiss. Math. Naturw. Cl. for 1884, 1885, p. 217.—
Zittel, Handb. Pal., 2, Munich, 1885, p. 608.—Brogger, Bihang till K. Sven.
Vet.-Akad. Handl., 11, No. 3, 1886, pp. 25, 26, 70; Afh. Sveriges Geol. Unders.,
ser. C, 1886, p. 70.—Woodward, Quart. Jour. Geol. Soc. London, 44, 1888,
p. 77.—Clarke, Jour. Morph., 2, 1888, pp. 254, 265.—Miller, N. A. Geol. Pal.,
1889, p. 530; 1st App. 1892, p. 704.—Walcott, Geol. Mag., dec. 4, 1, 1894, p.
247.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 701.—Koken, Die Leitfoss-
ilien, Leipzig, 1896, p. 26, fig. 16, 1, 2.—Beecher, Amer. Jour. Sci., 4th ser.,
3, 1897, p. 104, pl. 3, fig. 18.—Schmidt, Mem. l'Acad. Imp. Sci. St. Peters-
burg, 8th ser., 6, 1898, pp. 11, 12; 12, 1901, p. 4.—Jaekel, Zeits. d. d. geol.
Gesell., 53, 1901, p. 147.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 34,
No. 8, 1901, pp. 26, 37.—Cumings, 32d Ann. Rep. Dep. Geol. and Nat. Res.
Indiana, 1908, p. 1051.—Grabau and Shimer, N. A. Index Fossils, 2, 1910,
p. 290.—Raymond, Trans. and Proc. Roy. Soc. Canada, 5, 3d ser., sec. 4,
1912, p. 114.

ASAPHUS—Continued.

Cryptonymus Eichwald, Obs. geog.-zool., etc., de Tril. (not 1840), 1825, p. 44; Zool. Specialis, pt. 2, Vilnae, 1830, p. 114.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, pp. 541, 554.—Salter, Mon. Brit. Tril., Pal. Soc., 1866, p. 147, 160.—Vogdes, Mon. Genera Zethus, Cybele and Cryptonymus, 1878, p. 15.—Zittel, Handb. Pal., 2, Munich, 1885, p. 609.

Hemicrypturus Green, Mon. Tril. N. A. 1832, p. 20.—Burmeister, Org. der Tril., Berlin, 1843, p. 124; Org. Tril., 1846, p. 107.—Hawle and Corda, Abh. d. k. böhmischen Gesell. d. Wiss., 5, 1847, p. 69, pl. 4, fig. 37.

Observation.—Few of the above references apply to *Asaphus* s. s., but all are included here for future research upon this and allied genera.

ASAPHUS ALACER Billings. See *Brachyaspis alacer*.

ASAPHUS ALPHA Raymond. See *Basilicus marginalis*.

Asaphus? astragolotes Green.

Asaphus astragolotes Green Supp. 1, Mon. Trilobites N. A., 1835, p. 11.

Ordovician: Grenville Canal, Canada.

Plastotype.—Cat. No. 25698, U.S.N.M.

ASAPHUS BARRANDI Hall. See *Ptychopyge barrandi*.

ASAPHUS BETA Raymond. See *Isotelus beta*.

ASAPHUS BOLIVIENSIS D'Orbigny. See *Megalaspis? boliviensis*.

ASAPHUS CANADENSIS Chapman. See *Ogygites canadensis*.

ASAPHUS CANALIS Whitfield. See *Isoteloides whitfieldi*.

ASAPHUS CANALIS Hall. See *Isotelus canalis*.

ASAPHUS CANALIS Cleland. See *Asaphellus gyracanthus*.

Asaphus(?) caribouensis Walcott.

Asaphus Caribouensis Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 98, pl. 12, figs. 7, 7a, b.

Upper Pogonip: Ridge east of Hamburg Ridge, Eureka District, Nevada.

Cotype.—Cat. No. 24652, U.S.N.M.

ASAPHUS CAUDATUS Green. See *Dalmanites limulurus*.

ASAPHUS CONVEXUS Cleland. See *Symphysurus convexus*.

ASAPHUS CORDIERI Castelnau. See *Dalmanites, limulurus*.

ASAPHUS CORYCÆUS Conrad. See *Proetus corycæus*.

Asaphus? crypturus Green.

Asaphus crypturus Green, Suppl. Mon. Trilobites North Amer., 1835, p. 18.

Silurian: Moose River, Nova Scotia.

Plastotype.—Cat. No. 4835, U.S.N.M.

Asaphus(?) curiosus Billings.

Asaphus? Curiosus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 318, fig. 305.

Asaphus? curiosa Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 98, pl. 12, fig. 15.

Canadian: Stanbridge, Quebec (Beekmantown); Eureka District, Nevada (Pogonip).

Plesiotype.—Cat. No. 24651, U.S.N.M.

- ASAPHUS EDWARDSII** Castelnau. See *Dalmanites limulurus*.
- ASAPHUS EMORYI** Hall. See *Onchometopus emoryi*.
- ASAPHUS EXTANS** Winchell. See *Proetus stonemani*.
- ASAPHUS? EXTANS** Hall. See *Bathyrurus extans*.
- ASAPHUS GAMMA** Raymond. See *Basilicus marginalis*.
- ASAPHUS GIGAS** Dalman. See *Isotelus gigas*.
- ASAPHUS(?) GONTIURUS** Billings. See *Megalaspis goniurus*.
- ASAPHUS HALLI** Chapman. See *Ogygites canadensis*.
- ASAPHUS HINCKSI** Chapman. See *Ogygites canadensis*.
- ASAPHUS HOMALONOTOIDES** Walcott. See *Isoteloides homalonotoidea*.
- ASAPHUS HUTTONI** Billings. See *Basilicus huttoni*.
- ASAPHUS ILLÆNOIDES** Billings. See *Symphysurus illænoidea*.
- ASAPHUS (ISOTELUS) IOWENSIS** Owen. See *Isotelus iowensis*.
- Asaphus(?) latimarginata** Hall.
Asaphus? latimarginata Hall, Pal. New York, 1, 1847, p. 253, pl. 66, figs. 4a, b.
Asaphus latimarginatus Chapman, Canadian Jour., n. s., 2, 1857, p. 47.
 Utica: Near Watertown, Jefferson County, New York.
 Observation.—Possibly the same as *Ogygites canadensis* (Chapman).
- ASAPHUS LIMULURUS** Green. See *Dalmanites limulurus*.
- ASAPHUS MARGINALIS** Collie. See *Hemigyaspis collicana*.
- ASAPHUS MARGINALIS** Hall. See *Basilicus marginalis*.
- ASAPHUS MAXIMUS** Clarke. See *Isotelus maximus*.
- Asaphus megalophthalmus** Troost.
Asaphus megalophthalmus Troost, Mem. Soc. Geol. France, 3, 1838, p. 94, pl. 11, figs. 1-5; 5th Geol. Rep. Tennessee, 1840, p. 57; 6th Geol. Rep. Tennessee, 1841, p. 175 (nom. nud.).
 Silurian or Devonian: Perry County, Tennessee.
 Observation.—Not recognized. Probably refers to some Devonian species of *Phacops*.
- ASAPHUS MEGISTOS** of authors. See *Isotelus maximus*.
- Asaphus micropleurus** Green. Not recognized.
Asaphus micropleurus Green, Suppl. Mon. Tril. N. A., 1835, p. 21, cast No. 41.
 Trenton: Glens Falls, New York.
- ASAPHUS MORRISI** Billings. See *Basilicus huttoni*.
- ASAPHUS MURCHISONI** Castelnau. See *Isotelus gigas*.
- ASAPHUS NODOSTRIATUS** Hall. See *Bathyrurus extans*.
- ASAPHUS? NOTANS** Billings. See *Brachyaspis notans*.
- ASAPHUS OBTUSUS** Hall. See *Onchometopus obtusus*.

Asaphus(?) pelops Billings.

Asaphus pelops Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 317, fig. 304a, b.

Canadian (Beekmantown): Bedford, Missisquoi County, Quebec.

ASAPHUS PLANUS Dalman. See *Isotelus gigas*.

ASAPHUS PLATYCEPHALUS Stokes. See *Isotelus gigas*.

ASAPHUS PLATYCEPHALUS Billings. See *Isotelus latus* and *Brachyaspsis altilis*.

Asaphus(?) quadraticaudatus Billings.

Asaphus quadraticaudatus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 272, fig. 258.

Chazyan (Quebec-N. P.): Table Head and four miles northeast Portland Creek, Newfoundland.

ASAPHUS ROMINGERI Walcott. See *Basilicus romingeri*.

ASAPHUS SUSÆ Whitfield. See *Onchometopus susæ*.

ASAPHUS STOKESII Murchison. See *Proetus stokesii*.

Asaphus tetragonocephalus Green.

Asaphus tetragonocephalus Green, Amer. Jour. Sci., 25, 1834, p. 335; Suppl. Mon. Tril. N. A., 1835, p. 12, cast 38.

Ordovician(?): ?Newport, New York.

Plastotype.—Cat. No. 4948, U.S.N.M.

Observation.—The type is a specimen made up of two fragments of unidentified Cambrian trilobites, probably *Olenus*.

ASAPHUS? TRENTONENSIS Conrad. See *Amphilichas trentonensis*.

ASAPHUS TRIANGULATUS Whitfield. See *Isoteloides homalonotoides*.

ASAPHUS ULRICHI Miller. See *Basilicus romingeri*.

ASAPHUS VETUSTUS Hall. See *Basilicus vetustus*.

ASAPHUS (ISOTELUS) VIGILANS Meek and Worthen. See *Nileus vigilans*.

ASAPHUS WETHERILLI Green. See *Dalmanites limulurus*.

ASAPHUS WISCONSINENSIS Walcott. See *Basilicus romingeri*.

ASCO CERAS Barrande.

Genotype: *A. bohemicum* Barrande.

Ascoceras Barrande in Haidinger's Mittheil. d. Fr. d. Naturw., 3, 1847, p. 264-269; Neues Jahrb. f. Min., etc., 1854, p. 11, pl. 1, fig. 13a, b.—Pictet, Traité de Pal., 2d ed., 2, 1854, p. 639.—Barrande, Neues Jahrb. f. Min., etc., 1855, pp. 257, 260, pl. 3, figs. 1-10, p. 320; Bull. Soc. Geol. France, 2d ser., 12, 1855, p. 160, pl. 5, figs. 16-28.—Woodward, Mem. Mollusca, pt. 3, 1856, p. 450.—Billings, Canadian Nat. Geol., 2, 1857, p. 137, fig. 9.—Barrande, Neues Jahrb. f. Min., etc., 1860, p. 653; Syst. Sil. du Centre Bohème, 2, pt. 1, 1867, p. 334.—Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1881, p. 26, fig. 3.—Blake, Mon. British Foss. Cephalopoda, 1882, p. 60.—Zittel, Handb. Pal., 2, Munich, 1884, p. 372.—Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 279; 23, 1888, p. 483.—Lindström, Geol. Mag., dec. 3, 5, 1888, p. 532.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 246; 2, 1891, p. 387.—Miller, N. A. Geol. Pal. 1889, p. 432.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 23, No. 12, 1890, p. 14.—Koken, Die Leitfossilien, Leipzig, 1896, p. 49, text fig. 32, fig. 3.—Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 516; 2d ed., 1913, p. 596.

***Ascoceras anticostiense* Billings.**

Ascoceras newberryi Billings (part), Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 163, fig. 148b (adv. sheets, 1862).

Ascoceras Anticostiense Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1865, p. 60 (loc. ref.).

Gamachian (Ellis Bay): Gamache Bay, Anticosti.

***Ascoceras boreale* Parks.**

Ascoceras boreale Parks in Tyrrell, 22d Rep. Ontario Bur. Mines, 1913, p. 34.

Mohawkian or Richmond: Shamattawa River, Manitoba.

ASCOCERAS CANADENSE* Billings. See *Billingsites canadensis*.**Ascoceras costulatum* Whiteaves.**

Ascoceras costulatum Whiteaves, Canadian Rec. Sci., 6, 1895, p. 394; Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 215, pl. 22, fig. 1.

Black River or Richmond: Lake Winnipeg, Canada.

***Ascoceras gibberosum* Sardeson.**

Ascoceras gibberosum Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 102, pl. 6, figs. 8-10.

Ozarkian (Oneota): Dresbach, Minnesota.

***Ascoceras indianense* Newell.**

Ascoceras indianensis Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 484, figs.

Niagaran: Delphi, Indiana.

***Ascoceras newberryi* Billings.**

Ascoceras Newberryi Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 163, fig. 148a (adv. sheets, 1862); Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, pp. 23, 59 (loc. ref.).—Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 484.

Richmond (English Head and Charleton) and Gamachian: English Head, etc., Anticosti.

Niagaran: Delphi, Indiana (Newell).

ASCOCERAS NEWBERRYI* Billings (part). See *Ascoceras anticostiense*.**Ascoceras southwelli* Worthen.**

Ascoceras southwelli Worthen, Geol. Surv. Illinois, 8, 1890, p. 151, pl. 27, figs. 2, 2a.

Niagaran: Port Byron, Illinois.

***Ascoceras townsendi* Whiteaves.**

Ascoceras Townsendii Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 41, pl. 6, figs. 4, 4a; pt. 2, 1895, p. 103.

Niagaran (Guelph): Durham, Ontario.

***ASCODICTYON* Nicholson and Etheridge, Jun.**

Genotype: *A. stellatum* Nicholson and Etheridge, Jun.

Ascodictyon Nicholson and Etheridge, Jun., Ann. Mag. Nat. Hist. 4th ser., 19, 1877, p. 463.—Vine, Quart. Jour. Geol. Soc. London, 37, 1881, p. 618; 38, 1882, p. 52; Rep. 53d Meeting Brit. Assoc. Adv. Sci., 1884, p. 185; Proc. Yorkshire Geol. Polyt. Soc., 9, 1887, p. 183; 12, 1892, p. 86.—Miller, N. A. Geol. Pal., 1889, p. 293.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 367.—Simpson, 14th Rep. State Geol. New York for 1894, 1897, p. 603.—Nickles

ASCODICTYON—Continued.

and Bassler, Bull. U. S. Geol. Surv., 173, 1900, pp. 19, 172.—Ulrich and Bassler, Smiths. Misc. Coll., 45, 1904, p. 285.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 14.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 117.

ASCODICTYON RADIANUS Vine. See *Vinella radiciformis*.

ASCODICTYON RADICIFORME Vine. See *Vinella radiciformis*.

Ascodictyon siluriense Vine.

Ascodictyon stellatum Vine (not Nicholson and Etheridge), Quart. Jour. Geol. Soc. London, 37, 1881, p. 618.

Ascodictyon stellatum var. *siluriense* Vine, Quart. Jour. Geol. Soc. London, 38, 1882, p. 52, figs. 1, 2; Ann. Mag. Nat. Hist., 5th ser., 14, 1884, p. 81, fig. 7; Proc. Yorkshire Geol. and Polytech. Soc., 9, 1887, p. 184, pl. 12, fig. 6.

Ascodictyon siluriense Vine, Proc. Yorkshire Geol. Polytech. Soc., 12, 1892, p. 88, pl. 2, fig. 1.—Ulrich and Bassler, Smiths. Misc. Coll., 45, 1904, p. 286, pl. 68, figs. 11, 12.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 14, pl. 4, figs. 6-8.—Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 260, pl. 46, fig. 2.

Silurian: Shropshire, England (Wenlock); Lockport, etc., New York; Ontario, Canada (Rochester); Waldron, Indiana; Newsom, Tennessee (Waldron); Island of Anticosti (Jupiter River).

Helderbergian (Keyser): Cash Valley, Maryland.

Plesiotypes.—Cat. Nos. 43135, 43138, U.S.N.M.

ASCODICTYON STELLATUM Vine. See *Ascodictyon siluriense*.

ASCODICTYON STELLATUM SILURIENSE Vine. See *Ascodictyon siluriense*.

ASPIDOPORA Ulrich.

Genotype: *Aspidopora areolata* Ulrich.

Aspidopora Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 155.—Miller, N. A. Geol. Pal., 1889, p. 293.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 373; Geol. Minnesota, 3, 1893, p. 254.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 584.—Nickels and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 29.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 130.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 740.

Aspidopora areolata Ulrich.

Aspidopora areolata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 164, pl. 7, figs. 2-2c.

Monticulipora areolata J. F. James, *ibid.*, 16, 1894, p. 183.

Eden (Fulton): Cincinnati, Ohio, and vicinity.

Cotypes.—Cat. No. 43632, U.S.N.M.

Aspidopora calycula (James).

Lichenalia? *calycula* James, Cat. Foss. Cincinnati Group, 1871 (not defined).

Chaetetes? *calyculus* James, *Introd. Cat. Foss. Cincinnati Group*, 1875, p. 1.

Monticulipora (*Diplotrypa*) *calycula* Nicholson, Genus *Monticulipora*, 1881, p. 165, pl. 4, figs. 4-4b.

Prasopora calycula Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 165.

Monticulipora calycula James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 167.—J. F. James, *ibid.*, 16, 1904, p. 184.

Aspidopora calycula Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 173.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 16, pl. 1, figs. 8-10.

Trenton (Upper): Covington, Kentucky, and vicinity.

Aspidopora eccentrica (James).

Monticulipora (Heterotrypa?) *eccentrica* James, Paleontologist, No. 6, 1882, p. 48; No. 7, pl. 1, figs. 6, 6a.

Monticulipora *eccentrica* James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 167, pl. 2, figs. 2a-c.—J. F. James, *ibid.*, 16, 1894, p. 185.

Aspidopora *eccentrica* Ulrich, Geol. Minnesota, 3, 1893, p. 255.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 17, pl. 2, figs. 8-12; pl. 5, figs. 7, 8.

Eden (Southgate): Cincinnati, Ohio, and vicinity.

Aspidopora elegantula (Ulrich).

Aspidopora *elegantula* Ulrich, Geol. Minnesota, 3, 1893, p. 256, pl. 17, figs. 13-21.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, figs. 162-164 (p. 584).—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 130, fig. 186e.

Trenton (Prosser): Kenyon and St. Paul, Minnesota.

Cotypes.—Cat. No. 45499, U.S.N.M.

Aspidopora newberryi (Nicholson).

Chaetetes *Newberryi* Nicholson, Pal. Ohio, 2, 1875, p. 212, pl. 22, figs. 4, 4a.

Monticulipora (Praesopora) *Newberryi* Nicholson, Genus Monticulipora, 1881, p. 212, pl. 4, figs. 1-1e.

Praesopora? *newberryi* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 165.

Aspidopora *newberryi* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 91.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 130.

Monticulipora *newberryi* James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 164.—J. F. James, *ibid.*, 16, 1894, p. 179.

Eden (Economy): Cincinnati, Ohio, and vicinity.

Aspidopora parasitica (Ulrich).

Aspidopora *parasitica* Ulrich (part), 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 90; Geol. Minnesota, 3, 1893, p. 255, pl. 17, figs. 26-32.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 180.

Black River (Decorah): Minneapolis, St. Paul, and Fountain, Minnesota.

Cotypes.—Cat. No. 44051, U.S.N.M.

Aspidopora parmula (Foerste).

Praesopora *parmula* Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 170; 3, 1888, pl. 15, fig. 14.

Aspidopora *parmula* Foerste, Geol. Surv. Ohio, 7, 1895, p. 600, pl. 28, fig. 14.

Upper Medinan (Brassfield): Dayton, and Clinton County, Ohio.

Aspidopora parmula fenestelliformis Foerste.

Aspidopora *parmula* var. *fenestelliformis* Foerste, Geol. Surv. Ohio, 7, 1895, p. 600. Upper Medinan (Brassfield): Dayton, Ohio.

ASTERIAS ANTHONII Dana. See *Petraster jamesi*.

ASTERIAS ANTIQUA Troost. See *Mesopalæaster antiqua*.

ASTERIAS ANTIQUATA Locke. See *Promopalæaster speciosa*.

ASTERIAS (FOSSIL) Graham, Anthony, and James. See *Petraster americana*.

ASTERIAS MATUTINA Hall. See *Hudsonaster matutina*.

ASTRÆOPHYLLUM Nicholson and Hinde. See *Strombodes* Schweigger.

ASTRÆOPORA VETUSTA D'Orbigny. See *Protarea vetusta*.

ASTRÆOSPONGIA Roemer. Genotype: *Blumenbachium meniscus* Roemer.
Blumenbachium Roemer (not Konig, 1820), Neues Jahrb. f. Min., etc., 1848, pp. 680, 682.

Astræospongia Roemer, Sil. Fauna West. Tennessee, Breslau, 1860, p. 13; Cincinnati Quart. Jour. Sci., 1, 1874, p. 248.—Zittel, Handb. Pal., 1, Munich, 1879, p. 185.—Roemer, Leth. geog., 1, Theil, Leth. Pal., Erste Lief., 1880, p. 313.—Hinde, Mon. Brit. Foss. Sponges, Pal. Soc., 1888, p. 133.—Miller, N. A. Geol. Pal., 1889, p. 154.—Koken, Die Leitfossilien, Leipzig, 1896, p. 342.—Zittel-Eastman Textb. Pal., 1, 1900, p. 56.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 17.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 62.

***Astræospongia meniscus* (Roemer).**

Blumenbachium meniscus Roemer, Neues Jahrb. Min., 1848, p. 683, pl. 9, fig. 1.—Oswald, Zeits. d. d. geol. Gesell., 2, 1850, p. 83.

Astræospongia meniscus Roemer, Sil. Fauna West. Tennessee, 1860, p. 14, pl. 1, figs. 6, 6a-d.—Safford, Geol. Tennessee, 1869, pp. 311, 320, pl. 5 (H), figs. 1a-e.—Roemer, Cincinnati Quart. Jour. Sci., 1, 1874, p. 248; Leth. geog., Leth. Pal., 1, Atlas, 1876, pl. 9, fig. 2.—J. W. Hall and Gaertner, 30th Rep. New York State Mus. Nat. Hist., 1878, pp. 111-116, pl. 3, pp. 1-6.—Roemer, Leth. geog. 1, Theil., Leth. Pal., Erste Lief., 1880, p. 314, pl. 9, figs. 2a-2e.—Hinde, Cat. Foss. Sponges Brit. Mus., 1883, p. 148.—Miller, N. A. Geol. Pal., 1889, p. 154, text fig. 90.—Foerste, Jour. Geol., 11, 1903, p. 713, (loc. occ.).—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 18, fig. 27.

Niagaran: Brownsport, Perryville, etc., Tennessee (Brownsport); Louisville, Kentucky (Louisville).

ASTRASPIS Walcott.

Genotype: *A. desiderata* Walcott.

Astraspis Walcott, Bull. Geol. Soc. Amer., 3, 1892, p. 166.

***Astraspis desiderata* Walcott.**

Astraspis desiderata Walcott, Bull. Geol. Soc. Amer., 3, 1892, p. 166, pl. 3, figs. 6-14, pl. 4, figs. 1-4.

Black River (Harding): Canyon City, Colorado.

***Astrea fungiformis* Owen.**

Not recognized.

Astrea fungiformis Owen, Geol. Expl. Iowa, Wisconsin, and Illinois, 2d ed., 1844, p. 78, pl. 14, fig. 11.

Niagaran: Iowa and Wisconsin.

ASTREA? GIGAS Owen. See *Strombodes gigas*.

ASTREA MAMILLARIS Owen. See *Strombodes mamillaris*.

ASTREOPORA ORGANUM D'Orbigny. See *Syringophyllum organum*.

ASTROCERIUM Hall. See *Favosites Lamarck*.

ASTROCERIUM CONSTRICTUM Hall. See *Favosites constrictum*.

ASTROCERIUM PARASITICUM Hall. See *Favosites hisingeri*.

ASTROCERIUM PYRIFORME Hall. See *Favosites pyriformis*.

ASTROCERIUM VENUSTUM Whitfield. See *Favosites hisingeri*.

ASTROCONIA Sollas.

Genotype: *A. granti* Sollas.

Astroconia Sollas, Quart. Jour. Geol. Soc. London, 36, 1881, p. 254.—Miller, N. A. Geol. Pal., 1889, p. 154.

Astroconia granti Sollas.

Astroconia Granti Sollas, Quart. Jour. Geol. Soc. London, 37, 1881, pp. 254, 255, figs. 1-11.—Rauff, Palaeontographica, 40, 1894, p. 278, fig. 58.

Niagaran dolomite: Hamilton, Ontario.

ASTROCRINITES Conrad. See *Mariacrinus* Hall.

ASTROCRINITES PACHYDACTYLUS Conrad. See *Melocrinus pachydaetylus*.

ASTROCYSTITES Whiteaves. Genotype: *A. ottawaensis* Whiteaves.

Astrocystites Whiteaves, Canadian Rec. Sci., 7, 1897, p. 287.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 734.

Steganoblastus Whiteaves, Canadian Rec. Sci., 7, 1897, p. 305 (proposed to replace *Astrocystites* which was believed to be too much like *Asterocystis* Haeckel).—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 209, fig. 7.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 320.—Springer, Zittel-Eastman Textb. Pal., 1, 1913, p. 160.

Astrocystites ottawaensis Whiteaves.

Astrocystites Ottawaensis Whiteaves, Canadian Rec. Sci., 7, 1897, p. 287, figs. 1-3.

Steganoblastus canadensis (in error for *ottawaensis*) Whiteaves, Canadian Rec. Sci., 7, 1898, p. 396.

Steganoblastus ottawaensis Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 210, fig. 7.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 316, figs. 21, 21a, 22; p. 321, figs. 23, 24.

Trenton (Curdsville): Ottawa, Ontario.

Astroporites Lambe.

Genotype: *A. ottawaensis* Lambe.

Astroporites Lambe, Canadian Rec. Sci., 7, 1896, p. 1.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 174.

Astroporites ottawaensis Lambe.

Astroporites Ottawaensis Lambe, Canadian Rec. Sci., 7, 1896, p. 1, pl. 1.—

Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, pp. 173, 174.—

Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 46.

Trenton (Curdsville): Hull near Ottawa, and Kirkfield, Ontario; Mercer County, Kentucky.

Observation.—This genus and species, originally described as a bryozoan, is founded upon the attached basal disk of some crinoid.

ASTYLOMANON Rauff. See *Palaeomanon* Roemer.

ASTYLOMANON CRATERA Rauff. See *Palaeomanon cratera*.

ASTYLOMANON CRATERA ARYBALLIUM Rauff. See *Palaeomanon cratera*.

ASTYLOMANON CRATERA BALANTIUM Rauff. See *Palaeomanon cratera*.

ASTYLOMANON CRATERA CANTHARIUM Rauff. See *Palaeomanon cratera*.

ASTYLOMANON CRATERA CYLIX Rauff. See *Palaeomanon cratera*.

ASTYLOMANON CRATERA LECTYTHIUM Rauff. See *Palaeomanon cratera*.

ASTYLOMANON CRATERA PATERA Rauff. See *Palaeomanon cratera*.

ASTYLOMANON CRATERA POTERIUM Rauff. See *Palaeomanon cratera*.

ASTYLOMANON CRATERA PROMISCUUM Rauff. See *Palaeomanon cratera*.

ASTYLOMANON CRATERA PROTOTYPUM Rauff. See *Palaeomanon cratera*.

ASTYLOMANON PLEURIEXCAVATUM Rauff. See *Palaeomanon pleuriexcavatum*.

ASTYLOMANON VERRUCOSUM Rauff. See *Palaeomanon verrucosum*.

ASTYLOMANON VERRUCOSUM BULLIFERA Rauff. See *Palaeomanon verrucosum bullifera*.

ASTYLOSPONGIA Roemer. Genotype: *Siphonia præmorsa* Goldfuss.

Astylospongia Roemer, Sil. Fauna West Tennessee, 1860, p. 7; Cincinnati Quart. Jour. Sci., 1, 1874, p. 31.—Zittel, Ann. Mag. Nat. Hist., 4th ser., 20, 1877, p. 501; Neues Jahrb. Min., Geol. Pal., 1877, p. 353; Abh. math.-phys. Classe Akad. Wiss., 13, 1 Abth., 1878, p. 44.—Martin, Arch. Ver. Freun. Naturg. Mecklenburg, Jahrg., 31, 1878, pp. 2, 18.—Zittel, Handb. Pal., 1, 1879, p. 172.—Roemer, Leth. geog., 1, Theil. Leth. Pal., Erste Lief., 1880, p. 307.—Hinde, Cat. Foss. Sponges Brit. Mus., 1883, p. 91.—Zittel, Ann. Mag. Nat. Hist., 5th ser. 14, 1884, p. 271; Neues Jahrb. f. Min., Geol. Pal., 2, 1884, p. 75.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 9, 1887, pp. 246, 247.—Hinde, Mon. Brit. Foss. Sponges, Palaeont. Soc., 1888, p. 112.—Miller, N. A. Geol. Pal., 1889, p. 154.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 14, 1891, p. 55.—Rauff, Palaeontographica, 40, 1894, p. 289.—James, Amer. Nat., 29, 1895, p. 543.—Koken, Die Leitfossilien, 1896, p. 337.—Zittel-Eastman Textb. Pal., 1, 1900, p. 50; 2d ed., 1913, p. 55.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 14.

ASTYLOSPONGIA (PALÆOMANON) BURSA Hall. See *Palaeomanon bursa*.

Astylospongia?? christiana Meek and Worthen.

Astylospongia?? christiana Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 344, pl. 5, figs. 3a-c.

Niagaran: Carroll County, Illinois.

ASTYLOSPONGIA GREGARIA James. See *Hindia gregaria*.

Astylospongia imbricato-articulata (Roemer).

Siphonia imbricato-articulata Roemer, Neues Jahr. Min. Geol., Pal., 1848, p. 635.

Astylospongia imbricato-articulata Roemer, Sil. Fauna West Tennessee, 1860, p. 12, pl. 1, figs. 5, 5a; Cincinnati Quar. Jour. Sci., 1, 1874, p. 191.—Hall, 28th Rep. New York State Mus. Nat. Hist., Mus. ed., 1879, p. 104; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 224.—Foerste, Jour. Geol., 11, 1903, p. 714 (loc. occ.).

Niagaran: Various localities in Decatur and Perry Counties, Tennessee (Brownport); Louisville, Kentucky (Louisville).

ASTYLOSPONGIA INCISO-LOBATA Roemer. See *Caryomanon incisolobatum*.

ASTYLOSPONGIA INORNATA Hall. See *Hindia sphaeroidalis*.

Astylospongia parvula Billings.

Astylospongia parvula Billings, Geol. Vermont, 2, 1861, p. 956; Rep. Econ. Geol. Vermont, 1862, p. 956; Pal. Foss., 1, Geol. Surv. Canada, 1863, p. 20. (Advance sheets, 1861.)

Trenton: Ottawa, Ontario.

Astylospongia præmorsa (Goldfuss).

Siphonia præmorsa Goldfuss, Petref. Germ., 1826, p. 17, pl. 6, fig. 9a.

Astylospongia præmorsa Roemer, Sil. Fauna West Tennessee, 1860, p. 8, pl. 1, figs. 1, 1a-e.—Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 377, fig. 352—

Astylospongia præmorsa—Continued.

Roemer, Cincinnati Quart. Jour. Sci., 1, 1874, p. 32.—Meek and Worthen, Geol. Surv. Illinois, 6, 1875, p. 499, pl. 25, figs. 2, 2a.—Roemer, Leth. geol., 1, Theil, Leth. Pal., Erste Lief, 1880, p. 307, pl. 9, figs. 1a-c.—Miller, N. A. Geol. Pal., 1889, p. 154, fig. 91.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 224, fig. 3.—Rauff, Palæontographica, 40, 1894, p. 309, pl. 11, fig. 3.—Walker, Jour. and Proc. Hamilton Assoc., 11, 1895, p. 87, fig. 5.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 14, fig. 22.

Niagaran: West Tennessee, and many other localities.

Plenotype.—Cat. No. 49719, U.S.N.M.

Observation.—A very complete bibliography of this species is given by Rauff, 1894.

ASTYLOSONGIA PRÆMORSA Hall. See *Astylospongia præmorsa pusilla*.

ASTYLOSONGIA PRÆMORSA Roemer. See *Palæomanon verrucosum*.

ASTYLOSONGIA PRÆMORSA var. *NUXMOCHATA* Hall. See *Caryospongia juglans nuxmoschata*.

Astylospongia præmorsa pusilla Rauff.

Astylospongia præmorsa Hall, Trans. Albany Inst., 4, 1863, p. 228; 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, pl. 3, figs. 4-14 (Museum ed., 1879); 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 222, pl. 2, figs. 4-11, 14.

Astylospongia præmorsa var. *pusilla* Rauff, Palæontographica, 40, 1894, p. 309. Niagaran (Waldron): Waldron, Indiana; Newsom, Tennessee.

Plesiotype.—Cat. No. 46547, U.S.N.M.

ASTYLOSONGIA ROEMERI Hinde. See *Caryomanon roemeri*.

ASTYLOSONGIA STELLATIM-SULCATA Roemer. See *Carpomanon stellatim-sulcatum*.

ASTYLOSONGIA SUBROTUNDUS James. See *Hindia subrotunda*.

ASTYLOSONGIA TUMIDUS James. See *Pasceolus darwini*.

ATACTOPORA Ulrich (part). See *Atactoporella* Ulrich.

ATACTOPORA Ulrich.

Genotype: *Atactopora hirsuta* Ulrich.

Atactopora Ulrich (part), Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 119; Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 154; 6, 1883, p. 245.—Miller, N. A. Geol. Pal., 1889, p. 293.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 377; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 278.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 563.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 31.—Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, pp. 24, 31.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 334.

Atactopora angularis Ulrich and Bassler.

Atactopora angularis Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 32, pl. 8, figs. 10-12.

Richmond (Waynesville): Waynesville, Ohio.

Holotype.—Cat. No. 43193, U.S.N.M.

Atactopora hirsuta Ulrich.

Atactopora hirsuta Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 120, pl. 12, figs. 3-3b; 6, 1883, p. 245, pl. 12, figs. 1, 1a.—Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 31, pl. 8, fig. 14.

Eden and Maysville (Fairview): Covington and Newport, Kentucky; Cincinnati, Ohio.

Holotype.—Cat. No. 43619, U.S.N.M.

Atactopora intermedia Cumings and Galloway.

Atactopora intermedia Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 73, pl. 4, figs. 2, 2a; pl. 5, figs. 1-1d.

Eden (McMicken): Big Four Railroad, near Guilford, Indiana.

Atactopora maculata Ulrich.

Atactopora maculata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 121, pl. 12, figs. 2-22; 6, 1883, p. 245, pl. 12, figs. 2, 2a; Zittel's Textb. Pal. (Engl. ed.), 1896, fig. 466 (p. 278).—Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 31, pl. 8, fig. 13.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 333, fig. 483.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

Holotype.—Cat. No. 43619, U.S.N.M.

ATACTOPORA MULTIGRANOSA Ulrich. See *Atactoporella multigranosa*.

ATACTOPORA MUNDULA Ulrich. See *Atactoporella mundula*.

ATACTOPORA ORTONI Ulrich. See *Atactoporella ortonii*.

ATACTOPORA SEPTOSA Ulrich. See *Amplexopora septosa*.

ATACTOPORA SUBRAMOSA Ulrich. See *Heterotrypa subramosa*.

ATACTOPORA TENELLA Ulrich. See *Atactoporella tenella*.

ATACTOPORELLA Ulrich.

Genotype: *Atactoporella typicalis* Ulrich

Atactopora Ulrich (part), Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 119.

Peronopora Nicholson (part), Genus *Monticulipora*, 1881, p. 215.

Atactoporella Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 247.—Miller, N. A. Geol. Pal., 1899, p. 293.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 370; Geol. Minnesota, 3, 1893, p. 222; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 272.—Simpson, 14th Ann. Rep. State. Geol. New York for 1894, 1897, p. 585.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 28.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 127.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 740.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 331.

ATACTOPORELLA CRASSA Ulrich. See *Homotrypella hospitalis crassa*.

Atactoporella insueta Ulrich.

Atactoporella insueta Ulrich, Geol. Minnesota, 3, 1893, p. 224, pl. 15, figs. 13-15; pl. 18, figs. 5-8.

Black River (Decorah): Minneapolis, St. Paul, and Fountain, Minnesota.

Cotypes.—Cat. No. 43805, U.S.N.M.

Atactoporella multigranosa (Ulrich).

Atactopora multigranosa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 122, pl. 12, figs. 1, 1a.

Atactoporella multigranosa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 254, pl. 12, figs. 8, 8a.—J. F. James, *ibid.*, 18, 1895, p. 80.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 769, pl. 7, figs. 2, 2a.

Maysville (Fairmount-Corryville): Hamilton, Morrow, and Cincinnati, Ohio; southeastern Indiana.

Holotype.—Cat. No. 43626, U.S.N.M.

Atactoporella mundula (Ulrich).

Atactopora mundula Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 123, pl. 12, figs. 4, 4a..

Atactoporella mundula—Continued.

- Atactoporella mundula* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 252, pl. 12, figs. 6, 6a.—J. F. James, *ibid.*, 18, 1895, p. 80.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 770, pl. 7, figs. 3, 3a; pl. 26, fig. 6. Maysville (Fairmount): Covington, Kentucky, and Cincinnati, Ohio.
Holotype.—Cat. No. 43623, U.S.N.M.

Atactoporella newportensis Ulrich.

- Atactoporella newportensis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 250, pl. 12, figs. 4-4b.—Miller, N. A. Geol. Pal., 1889, fig. 456, p. 29.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 770, pl. 7, fig. 4; pl. 26, fig. 7.
Monticulipora newportensis James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 183.—James, *ibid.*, 16, 1894, p. 206.
 Eden (Economy): Newport, Kentucky.
Cotypes.—Cat. No. 43627, U.S.N.M.

Atactoporella ortonii (Nicholson).

- Chaetetes Ortoni* Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 513, pl. 29, figs. 15-15b; Pal. Ohio, 2, 1875, p. 211, pl. 22, figs. 3-3b.
Atactopora ortonii Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 120 (gen. ref.).
Monticulipora (Peronopora?) *Ortoni* Nicholson, Genus *Monticulipora*, 1881, p. 228, pl. 3, figs. 4-4d.
Atactoporella ortonii Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 256, pl. 12, figs. 7, 7a.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 771, pl. 7, figs. 5, 5a; pl. 26, fig. 11.
Monticulipora ortonii James and James, Jour. Cincinnati Soc. Nat. Hist., 1888, 11, p. 22.—James, *ibid.*, 18, 1895, p. 79.
 Maysville (Bellevue and Corryville): Cincinnati, Ohio, and vicinity.
Plesiotype.—Cat. No. 43629, U.S.N.M.

Atactoporella ramosa Ulrich.

- Atactoporella ramosa* Ulrich, Geol. Minnesota, 3, 1893, p. 226, pl. 20, figs. 22-27. Black River (Decorah): Cannon Falls, Minnesota.
Cotypes.—Cat. No. 43500, U.S.N.M.

Atactoporella schucherti Ulrich.

- Atactoporella schucherti* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 251, pl. 12, figs. 5-5b.—J. F. James, *ibid.*, 18, 1895, p. 80.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 772, pl. 7, figs. 6, 6a.
 Richmond (Waynesville-Whitewater): Oxford, Waynesville, etc., Ohio; Richmond and Versailles, Indiana.
Holotype.—Cat. No. 43628, U.S.N.M.

Atactoporella tenella (Ulrich).

- Atactopora tenella* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 123, pl. 12, figs. 5, 5a.
Atactoporella tenella Ulrich, *ibid.*, 6, 1883, p. 246.—J. F. James, *ibid.*, 18, 1895, p. 80.
 Maysville (Fairmount): Cincinnati, Ohio, and vicinity.
Holotype.—Cat. No. 43624, U.S.N.M.

Atactoporella typicalis (Ulrich).

- Atactoporella typicalis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 248, pl. 12, figs. 3-3d.—J. F. James, *ibid.*, 18, 1895, p. 80.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 272, fig. 450.—Simpson, 14th Ann. Rep. State

Atactoporella typicalls—Continued.

Geol. New York for 1894, 1897, p. 585, figs. 165-167.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 128, fig. 186b.—Baesler, Zittel-Eastman Textb. Pal., 1913, p. 332.

Eden (Economy): Covington, Kentucky, and vicinity.

Cotypes.—Cat. No. 43625, U.S.N.M.

Atactoporella typicalls praecepta Ulrich.

Atactoporella typicalis var. praecepta Ulrich, Geol. Minnesota, 3, 1893, p. 223, pl. 15, figs. 16, 17, pl. 18, figs. 1-4.

Black River (Decorah): Minneapolis, St. Paul, and Fountain, Minnesota.

Cotypes.—Cat. Nos. 43806, 43872, U.S.N.M.

ATAXIACRINUS Lyon. See *Anomalocrinus* Meek.

ATAXOCRINUS Bather. See *Anomalocrinus* Meek.

ATELOCYSTIS Haeckel. See *Ateleocystites* Billings.

ATELOCYSTITES Billings.

Genotype: *A. huxleyi* Billings.

Ateleocystites Billings, Geol. Surv. Canada, Can. Org. Rem., dec. 3, 1858, pp.

72, 73.—Chapman, Expos. Min. Geol. Canada, 1864, p. 110.—Salter, Cat.

Camb. Sil. Foss., 1873, p. 128.—Zittel, Handb. Pal., 1, Munich, 1879, p.

413.—Woodward, Geol. Mag., dec. 2, 7, 1880, p. 194.—Walther, Palaeont-

graphica, 32, 1886, p. 193.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 674.

Ateleocystis Haeckel, Amphorideen u. Cystoideen, 1896, p. 41, pl. 2, figs. 10-12.

Enoploura Wetherby, Jour. Cincinnati Soc. Nat. Hist., 1, 1879, p. 163.—Jaekel,

Zeits. d. d. Geol. Gesell., 52, 1900, p. 668.—Bather, Treatise on Zool., pt. 3,

Echinoderma, London, 1900, p. 51 (Genotype *Anomalocystites balanoides*

Meek).

Anomalocystites in part of authors.

Ateleocystites balanoides (Meek).

Anomalocystites (*Ateleocystites*?) *balanoides* Meek, Amer. Jour. Sci. Arts, 3d ser., 3, 1872, p. 423; Geol. Surv. Ohio, 1, pt. 2, 1873, p. 41, pl. 3, bis. fig. 6a-c.

Enoploura balanoides Wetherby, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 162, pl. 7, figs. 1a-g; p. 164, pl. 1, figs. 1-5.

Ateleocystites balanoides Woodward, Geol. Mag., dec. 2, 7, 1880, p. 198, pl. 6, figs. 5-15.

Anomalocystites balanoides Miller, N. A. Geol. Pal., 1889, p. 224, fig. 247.

Placocystis balanoides Haeckel, Amphorideen u. Cystoideen, 1896, pl. 2, figs. 5-7.

Placocystis crustacea Haeckel, Amphorideen u. Cystoideen, Leipzig, 1896, p. 39, figs. 1, 2.

Enoploura crustacea Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 51.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

Ateleocystites huxleyi Billings.

Ateleocystites *Huxleyi* Billings, Geol. Surv. Canada, Can. Org. Rem., dec. 3, 1858, pp. 72, 73, fig. 4.—Woodward, Geol. Mag., 7, 1870, p. 261, footnote;

8, 1871, p. 72, text figs. 1-7; dec. 2, 7, 1880, pl. 6, fig. 1.

Anomalocystites *Huxleyi* Miller, N. A. Geol. Pal., 1889, p. 224.

Ateleocystis *Huxleyi* Haeckel, Amphor. und Cystoid., 1896, p. 41.

Trenton (Curdsville): Hull and Ottawa, Canada.

ATHYRIS McCoy.Genotype: *Terebratulina concentrica* Von Buch.

Athyris McCoy, Carb. Fossils Ireland, 1844, pp. 123, 146.—Hall, 13th Rep. New York State Cab. Nat. Hist., 1860, p. 73.—Billings, Canadian Jour., 5, 1860, p. 273; 6, 1861, p. 138; Pal. Fossils, 1, 1862, p. 144.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, pp. 152, 258; Pal. New York, 4, 1867, p. 282.—Billings, Amer. Jour. Sci., 44, 1867, p. 48.—Herrick, Bull. Denison Univ., 4, 1888, p. 14.—Nettelroth, Kentucky Fossil Shells, Mem. Geol. Surv. Kentucky, 1889, p. 87.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 83, fig. 57 on p. 86; 13th Ann. Rep. New York State Geol., 1895, p. 777.
Spirigera D'Orbigny, Paris Acad. Sci., Comptes Rendus, 25, 1847, p. 268.
Euthyris Quenstedt, Petrefactenkunde Deutschlands, 1871, p. 442.

ATHYRIS Billings (1863). See *Meristella* Hall.*ATHYRIS ANTICOSTIENSIS* Billings. See *Catazyga anticostiensis*.*ATHYRIS BOREALIS* Billings. See *Catazyga headi borealis*.*ATHYRIS CYLINDRICA* Billings. See *Whitfieldella cylindrica*.*ATHYRIS HEADI* Billings. See *Catazyga headi*.*ATHYRIS HEADI ANTICOSTIENSIS* Billings. See *Catazyga anticostiensis*.*ATHYRIS HEADI BOREALIS* Billings. See *Catazyga headi borealis*.*ATHYRIS INTERMEDIA* Nicholson and Hinde. See *Whitfieldella intermedia*.*ATHYRIS JULIA* Billings. See *Whitfieldella*(?) *julia*.*ATHYRIS JUNIA* Billings. See *Hyattidina congesta junia*.*ATHYRIS LARA* Billings. See *Whitfieldella lara*.*ATHYRIS NAVIFORMIS* Billings. See *Whitfieldella*(?) *naviformis*.*ATHYRIS NITIDA* Hall. See *Whitfieldella nitida*.*ATHYRIS PRINSTANA* Billings. See *Hindella prinstana*.*ATHYRIS SOLITARIA* Billings. See *Whitfieldella*? *solitaria*.*ATHYRIS? TRISINUATUS* McChesney. See *Meristina trisinuata*.*ATHYRIS TUMIDA* Roemer. See *Meristina maria roemeri*.*Athyris*(?) *tumidula* Billings.

Athyris tumidula Billings, Cat. Sil. Foss. Anticosti, 1866, p. 47.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 150.

Anticostian (Gun River and Jupiter River): Jupiter River, etc., Anticosti.

ATHYRIS TURGIDA Shaler. See *Hindella prinstana*.*ATHYRIS UMBONATA* Billings. See *Hindella umbonata*.*ATOPS FISCHERI* Miller. See *Triarthrus fischeri*.

ATRYPA Dalman.Genotype: *Anomia reticularis* Linnaea.

Atrypa Dalman, Kongl. Svenska Vet.-Akad. Handl., 1828, p. 102.—Billings, Canadian Nat. Geol., 1, 1856, p. 134; Canadian Jour., 6, 1861, p. 264.—Chapman, Canadian Jour., n. s., 7, 1862, p. 114; Expos. Min. Geol. Canada, 1864, p. 117.—Whitfield, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 141, pl. 1.—Hall, Pal. New York, 4, 1867, p. 312.—Zittel, Handb. Pal., 1, Munich, 1880, p. 688.—Davidson, Mon. Brit. Foss. Brachiopoda, 5, Sil. Suppl., Pal. Soc., 1882, p. 84.—Miller, N. A. Geol. Pal., 1889, p. 335.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 88.—Beecher, Amer. Jour. Sci., 3d ser., 44, 1892, p. 147.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 163; 13th Ann. Rep. New York State Geol., 1895, p. 818.—Koken, Die Leitfossilien, Leipzig, 1896, p. 241, fig. 202, 203.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 226; Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 334.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 195.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 309.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 409.

ATRYPA ACUTIROSTRA Hall. See *Zygospira*(?) *acutirostris*.

ATRYPA AFFINIS Vanuxem. See *Atrypa reticularis*.

ATRYPA ALTILIS Hall. See *Camarotoechia plena*.

ATRYPA AMBIGUA Hall. See *Camarella ambigua*.

ATRYPA APRINIS Hall. See *Homœospira apriniformis*.

Atrypa arctostriata (Foerste).

Atrypa reticularis arctostriatus Foerste, Jour. Geol., 11, 1903, p. 710.

Atrypa arctostriata Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 93, pl. 2, figs. 34A, B.

Niagaran (Brownsport): Near Brownsport Furnace, three miles west Vice Landing, Tennessee.

Atrypa? biconvexa Maynard.

Atrypa? biconvexa Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 393, pl. 68, figs. 1-3.

Helderbergian (Keyser): Keyser, West Virginia; Cash Valley, Maryland.

ATRYPA BIDENS Hall. See *Rhynchonella*(?) *bidens*.

ATRYPA BIDENTATA Hall. See *Rhynchonella*(?) *bidentata*.

ATRYPA BISULCATA Hall. See *Cyclospira bisulcata*.

ATRYPA BREVIROSTRIS Hall. See *Anastrophia brevirostris*.

Atrypa calvini Nettelroth.

Atrypa calvini Nettelroth, Kentucky Foss. Shells, Mem. Kentucky Geol. Surv., 1889, p. 89, pl. 32, figs. 64-66.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 440, pl. 8, figs. 13-15.

Niagaran: Louisville, Kentucky (Louisville); Delphi, Pendleton, etc., Indiana (Noblesville).

Holotype.—Cat. No. 51331, U.S.N.M.

ATRYPA CAMURA Hall. See *Trematospira camura*.

ATRYPA CAPAX Conrad. See *Rhynchotrema capax*.

ATRYPA CHEMUNGENSIS Conrad. See *Atrypa reticularis*.

- ATRYPA CIRCULARIS* Hall. See *Parastrophia hemiplicata*.
- ATRYPA CONGESTA* Conrad. See *Hyattidina congesta*.
- ATRYPA CORALLIFERA* Hall. See *Dictyonella corallifera*.
- ATRYPA CRASSIROSTRA* Hall. See *Whitfieldella cylindrica*.
- ATRYPA CUNEATA* Hall. See *Rhynchotrema cuneata americana*.
- ATRYPA CUSPIDATA* Hall. See *Triplecia cuspidata*.
- ATRYPA CYLINDRICA* Hall. See *Whitfieldella cylindrica*.
- ATRYPA DEFLECTA* Hall. See *Zygospira deflecta*.
- ATRYPA DENTATA* Hall. See *Rhynchotrema dentatum*.
- ATRYPA DISPABILIS* Hall. See *Atrypina disparilis*.
- ATRYPA DUBIA* Hall. See *Protorhyncha dubia*.
- ATRYPA EMACERATA* Hall. See *Rhynchonella emacerata*.
- ATRYPA EQUIRADIATA* Hall. See *Camarotoechia æquiradiata*.
- ATRYPA EXIGUA* Hall. See *Zygospira exigua*.
- ATRYPA EXTANS* Emmons. See *Triplecia extans*.
- ATRYPA FLABELLA* Shaler. See *Cœlospira hemispherica*.
- ATRYPA GALEATA* Dalman. See *Gypidula* (*Sieberella*) *galeata*.
- ATRYPA GRAYI* Davidson. See *Streptis grayi*.
- Atrypa(?) gibbosa* Hall.
Atrypa gibbosa Hall, Pal. New York, 2, 1852, p. 79, pl. 20, fig. 10.
 Clinton: Clinton, New York.
- ATRYPA HEMIPLICATA* Hall. See *Parastrophia hemiplicata*.
- ATRYPA HEMISPHERICA* Sowerby. See *Cœlospira hemispherica*.
- ATRYPA IMBRICATA* Hall. See *Atrypa nodostriata*.
- ATRYPA IMPRESSA* Shaler. See *Atrypa reticularis*.
- ATRYPA INCREBESCENS* Hall. See *Rhynchotrema capax* and *R. inæquivalve*.
- ATRYPA INTERMEDIA* Hall. See *Whitfieldella intermedia*.
- ATRYPA INTERPLICATA* Hall. See *Anastrophia interplicata*.
- ATRYPA LÆVIS* Vanuxem. See *Whitfieldella lævis*.
- ATRYPA LAMELLATA* Hall. See *Camarotoechia lamellata*.
- ATRYPA? LARA* Schuchert. See *Whitfieldella? lara*.
- Atrypa laticorrugata* Foerste.
Atrypa lati-corrugata Foerste, Geol. Ohio, 7, 1895, p. 591, pl. 57A, fig. 16.
 Upper Medinan (Brassfield): Dayton, Ohio.
- ATRYPA LENS* Sowerby. See *Stricklandinia lens*.
- ATRYPA LENTIFORMIS* Vanuxem. See *Atrypa reticularis*.

Atrypa mansonii (Salter).

Rhynchonella mansonii Salter, Sutherland's Jour. Voyage Baffins Bay, etc., 2, 1852, p. ccxxi, pl. 5, fig. 5.—Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 596.

Atrypa masonii Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 153.

Niagaran: Near Wellington Channel, Bessels Bay, Arctic America.

Atrypa marginalis (Dalman).

Terebratula marginalis Dalman, Kongl. Svenska Vet.-Akad. Handl. for 1827, 1828, p. 59, pl. 6, fig. 6.

Atrypa marginalis Roemer, Sil. Fauna west. Tennessee, 1860, p. 69, pl. 5, fig. 10.—Billings, Cat. Sil. Foss. Anticosti, 1866, p. 46.—Hall and Whitfield, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 197.—Davidson, Geol. Mag., dec. 2, 8, 1881, p. 10, fig. 9; Mon. Brit. Foss. Brachiopoda, 5, Sil. Suppl., Pal. Soc., 1882, p. 122.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 314, pl. 6, figs. 8, 9; Geol. Ohio, 7, 1895, p. 591, pl. 25, figs. 6, 9; pl. 31, figs. 8, 9.—Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 55, figs. 24, 25.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 309.

Trematospira matthewsoni McChesney, Descriptions New Pal. Fos., 1860, p. 71; Trans. Chicago Acad. Sci., 1, 1868, p. 32, pl. 7, fig. 3.

Atrypa nodostriata Foerste (not Hall), Bull. Denison Univ., 1, 1885, p. 90, pl. 13, fig. 9.

Atrypa marginalis var. multistriata Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 316, pl. 6, fig. 8.

Silurian: Europe; Anticosti, etc., Canada; New York, Pennsylvania, Ohio, etc. (Brassfield-Niagaran).

ATRYPA MARGINALIS var. **MULTISTRIATA** Foerste. See *Atrypa marginalis*.

ATRYPA MODESTA Hall. See *Zygospira modesta*.

ATRYPA NAVIFORMIS Hall. See *Whitfieldella*(?) *naviformis*.

ATRYPA NEGLECTA Hall. See *Camarotoechia* (*Stegerhynchus*) *neglecta*.

ATRYPA NITIDA Hall. See *Whitfieldella nitida*.

ATRYPA NITIDA var. **OBLATA** Hall. See *Whitfieldella oblata*.

ATRYPA NODOSTRIATA Foerste. See *Atrypa marginalis*.

Atrypa nodostriata Hall.

Atrypa imbricata Hall (not Sowerby), Geol. New York, Rep. 4th Dist., 1843, Tab. Org. Rem., 13, fig. 1.

Atrypa nodostriata Hall, Pal. New York, 2, 1852, p. 272, pl. 56, fig. 2.—Hall and Whitfield, Pal. Ohio, 2, 1875, p. 133, pl. 7, figs. 12–14.—Safford, Geol. Tennessee, 1869, p. 315, text fig. 5.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 196, fig. 114; Bull. New York State Mus., 45, 1901, p. 196, fig. 113.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 309, fig. 387.

Niagaran: Lockport, etc., New York (Rochester); Ontario; Ohio; Kentucky; Wisconsin; Tennessee.

ATRYPA NUCLEOLATA Hall. See *Whitfieldella*(?) *nucleolata*.

ATRYPA NUCLEUS Hall. See *Triplecia nucleus*.

ATRYPA OBTUSIPPLICATA Hall. See *Camarotoechia obtusiplicata*.

Atrypa orbicularis Owen.

Atrypa orbicularis Owen, Geol. Expl. Iowa, Wisconsin, Illinois, 2d ed., 1844, p. 80, pl. 15, fig. 9.

Atrypa orbicularis—Continued.

Ordovician: Iowa.

Observation.—Not recognized. Figure represents internal cast of some undetermined brachiopod.

ATRYPA PHOCA of authors. See *Lissatrypa phoca*.**ATRYPA PLANOCONVEXA** Hall. See *Cœlospira planoconvexa*.**ATRYPA PLENA** Hall. See *Camarotoechia plena*.**ATRYPA PLICATA** Hall. See *Rhynchonella plicata*.**ATRYPA PLICATELLA** Hall. See *Rhynchonella plicatella*.**ATRYPA PLICATULA** Hall. See *Cœlospira plicatula*.**ATRYPA PLICIFERA** Hall. See *Camarotoechia plena*.**Atrypa præmarginalis** Savage.*Atrypa præmarginalis* Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 84, pl. 4, figs. 14–16.

Upper Medinan (Edgewood): Near Edgewood and Watson Station, Pike County, Missouri; near Thebes, Illinois.

ATRYPA PRISCA Vanuxem. See *Atrypa reticularis*.**Atrypa putilla** (Hall and Clarke).*Zygospira putilla* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 157, fig. 150; p. 365, pl. 54, figs. 35–37; pl. 83, figs. 29, 30.—Hall, 48th Rep. New York State Mus., 2, 1897, p. 362, pl. 9, figs. 31, 32.—Hall and Clarke, 14th Rep. State Geol. New York for 1894, 1897, p. 362, pl. 9, figs. 31, 32.*Atrypa putilla* Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 85, pl. 4, fig. 25.

Upper Medinan (Edgewood): Thebes, Illinois; Edgewood and Louisiana, Missouri.

ATRYPA QUADRICOSTATA Hall. See *Hyattidina congesta*.**ATRYPA RECURVIROSTRIS** Hall. See *Zygospira recurvirostris*.**Atrypa reticularis** (Linnæus).*Anomia reticularis* Linnæus, Syst. Nat., 12th ed., 1, 1767, p. 1132.*Atrypa chemungensis* Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 265.—Vanuxem, Geol. New York, Rep. 3d Dist., 1842, p. 182, fig. 4.*Hipparionyx consimilis* Vanuxem, Geol. New York, Rep. 3d Dist., 1842, p. 132, fig. 2.*Atrypa affinis* Vanuxem, Geol. New York, Rep. 3d Dist., 1842, p. 88, fig. 12.—Hall, *ibid.*, Rep. 4th Dist., 1843, p. 88, fig. 12.*Atrypa prisca* Vanuxem, Geol. New York, Rep. 3d Dist., 1842, p. 139, fig. 5.—Hall, *ibid.*, Rep. 4th Dist., 1843, p. 175, fig. 5; p. 198, fig. 4.—Owen, Geol. Expl. Iowa, Wisconsin, Illinois, 1844, pl. 12, figs. 2, 10.—Billings, Canadian Nat. Geol., 1, 1856, p. 474, pl. 7, fig. 11.*Atrypa lentiformis* Vanuxem, Geol. New York, Rep. 3d Dist., 1842, p. 163, fig. 3, p. 164.—Hall, *ibid.*, Rep. 4th Dist., 1843, p. 215, fig. 3.*Strophomena ithacensis* Vanuxem Geol. New York, Rep. 3d Dist., 1842, p. 174, fig. 2.*Atrypa tribulis* Hall, Geol. New York, Rep. 4th Dist., 1843, p. 271, fig. 3.*Terebratula prisca* Castelnau, Essai Syst., Sil. l'Amérique Septent., 1843, p. 40, pl. 13, fig. 8.

Atrypa reticularis—Continued.

Terebratulula reticularis Hall, Amer. Jour. Sci., 2d ser., 20, 1849, p. 227.—Yandell and Shumard, Cont. Geol. Kentucky, 1847, p. 10.

Atrypa impressa Shaler (not Hall), Bull. Mus. Comp. Zool., 4, 1865, p. 68.

Atrypa reticularis Hall, Pal. New York, 2, 1852, p. 72, pl. 23, fig. 8; p. 270, pl. 55, fig. 5.—Billings, Canadian Nat. Geol., 1, 1856, p. 137, pl. 2, fig. 10.—Hall, Geol. Surv. Iowa, 2, 1858, p. 515; Pal. New York, 3, 1859, p. 253, pl. 42, fig. 1.—Roemer, Sil. Fauna west. Tennessee, 1860, p. 69, pl. 5, fig. 9.—Billings, Canadian Jour., 6, 1861, p. 264, figs. 84–87; Geol. Canada, 1863, p. 318, fig. 335; p. 384, fig. 416.—Hall, Pal. New York, 4, 1867, p. 316, pl. 52, figs. 1–3, 7–12; pl. 53, figs. 3–19; pl. 53A, figs. 22, 23.—Meek, Trans. Chicago Acad. Sci., 1, 1868, p. 97, pl. 13, fig. 13.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 432, pl. 13, fig. 11.—Meek, Simpson's Rep. Expl. Great Basin Terr. Utah, 1876, p. 347, pl. 1, fig. 6.—King's U. S. Geol. Surv. Expl. 40th Parl., 4, 1877, p. 38, pl. 1, fig. 7; pl. 3, fig. 6.—Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 596.—Hall, 28th Rep. New York. State Mus. Nat. Hist., 1879, p. 162, pl. 25, figs. 44–47.—White, 2d Ann. Rep. Indiana Bureau Statistics and Geol., 1880, p. 502, pl. 5, figs. 7–9; 10th Rep. State Geol. Indiana, 1881, p. 134, pl. 5, figs. 7–9; 11th Rep., 1882, p. 304, pl. 25, figs. 44–47.—Whitfield, Geol. Wisconsin, 4, 1882, p. 333, pl. 26, fig. 6.—Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 150, pl. 14, fig. 6.—Beecher and Clarke, Mem. New York State Mus. Nat. Hist., 1, 1889, p. 51, pl. 4, figs. 12–20.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Surv., 1889, p. 91, pl. 14, figs. 12–23; pl. 15, fig. 1.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 314.—Whiteaves, Cont. Canadian Pal., 1, 1892, p. 289, pl. 37, fig. 8.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 165, fig. 153; pl. 55, figs. 1–17.—Herrick, Geol. Ohio, 7, 1895, pl. 20, fig. 7.—Davidson, Mon. British Devonian Brach. Pal. Soc., 1864, p. 53, pl. 10, figs. 3, 4; 1867, p. 129, pl. 14, figs. 1–22; 1882, pp. 109, 110, figs.; pl. 6, figs. 14, 15; pl. 7, figs. 1–6.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, pp. 57–60, figs.—Miller, N. A. Geol. Pal., 1889, pp. 336, 337, figs. 541–543.—Grabau, Bull. Buffalo Soc. Nat. Sci., 8, 1901, p. 195, fig. 112; Bull. New York State Mus., 45, 1901, p. 195, fig. 112.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 440, pl. 8, figs. 16–18.—Grabau, Michigan Geol. Surv., geol. ser. 1, 1909, p. 162, pl. 20, fig. 1.—Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 392, pl. 67, figs. 26–28.—Holtedahl, 2d Arct. Exp. *Fram*, 1898–1902, No. 32, 1914, p. 23, pl. 8, fig. 5.

Silurian and Devonian: World-wide distribution.

ATRYPA RETICULARIS ARCTOSTRIATUS Foerste. See *Atrypa arctostriata*.

Atrypa reticularis newsomensis Foerste.

Atrypa reticularis newsomensis Foerste, Jour. Geol., 11, 1903, p. 710.—Foerste, Bull. Sci. Lab. Denison Univ. 14, 1909, p. 93, pl. 1, fig. 11A, B.

Niagaran (Waldron): Newsom, etc., Tennessee.

Atrypa reticularis niagarensis Nettelroth.

Atrypa reticularis var. *niagarensis* Nettelroth, Kentucky Fossils Shells, Mem. Kentucky Geol. Surv., 1889, p. 92, pl. 32, figs. 5–8, 44–47.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 13.

Niagaran (Waldron-Louisville): Louisville, etc., Kentucky; Clarke County, Waldron, etc., Indiana; Newsom, etc., Tennessee.

Cotypes.—Cat. No. 51314, U.S.N.M.

ATRYPA ROBUSTA Hall. See *Rhynchotretra robusta*.

Atrypa rugosa Hall.

Atrypa rugosa Hall, Pal. New York, 2, 1852, p. 271, pl. 56, fig. 1.—Hall and Clarke, *ibid.*, 8, pt. 2, 1893, p. 171.—Grabau, Bull. New York State Mus., 45, 1901, p. 196, fig. 114; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 196, fig. 114.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 310, fig. 388.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 13, pl. 2, fig. 6.

Rhynchonella rugosa Billings, Geol. Canada, 1863, p. 315, fig. 321.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 899, fig.

Niagaran: Lockport, etc., New York, and Ontario (Rochester); Indiana; Ohio (West Union); Kentucky; Anticosti.

ATRYPA SEMIPLICATA Conrad. See *Camarotoechia semiplicata*.

ATRYPA SORDIDA Hall. See *Plectorthis* (*Encyclodema*) *sordida*.

ATRYPA SUBTRIGONALIS Hall. See *Rhynchotrema subtrigonale*.

ATRYPA SULCATA Vanuxem. See *Whitfieldella sulcata*.

ATRYPA TRIBULIS Hall. See *Atrypa reticularis*.

Atrypa tubulistriata Savage.

Atrypa tubulistriata Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 86, pl. 5, figs. 23 and 24.

Upper Medinan (Edgewood): Louisiana and mouth of Buffalo Creek, Pike County, Missouri; south of Hamburg, Illinois.

ATRYPINA Hall and Clarke.

Genotype: *Leptocœlia imbricata* Hall.

Atrypina Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 161, fig. 152; 13th Ann. Rep. New York State Geol. 1895, p. 815.—Schuchert, Zittel-Eastman Textb. Pal., 1900, p. 334; 2d ed., 1913, p. 408.

Atrypina clintoni Hall and Clarke.

Atrypina clintoni Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 162, pl. 53, figs. 7, 17-19; pl. 83, fig. 6; 48th Rep. New York State Mus., 2, 1897, p. 362, pl. 9, figs. 27-30; 14th Rep. State Geol. New York for 1894, 1897, p. 362, pl. 9, figs. 27-30.

Clinton: Orleans County, New York.

Atrypina disparilis (Hall).

Atrypa disparilis Hall, Pal. New York, 2, 1852, p. 277, pl. 57, fig. 6.—Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 53, figs. 1-4.

Leptocœlia disparilis Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 77.

Trematospira? *disparilis* Hall, 16th Rep., *ibid.*, 1863, p. 60; Trans. Albany Institute, 4, 1863, p. 146.

Coelospira disparilis Hall, 28th Rep. New York State Mus. Nat. Hist., 1879, p. 162, pl. 25, figs. 39-43; 11th Rep. State Geol. Indiana, 1882, p. 363, pl. 25, figs. 39-43.—Beecher and Clarke, Mem. New York State Mus. Nat. Hist., 1, 1889, p. 64, pl. 5, figs. 17-23.

Atrypina disparilis Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 156.

Niagaran: Wolcott, etc., New York (Wolcott-Rochester); Waldron, Indiana; Tennessee (Waldron).

Atrypina intermedia (Hall).

Leptocœlia intermedia Hall, Canadian Nat. Geol., 1860, 5, p. 147, fig. 5.—Dawson, Acadian Geology, 3d ed., 1878, p. 598, fig. 202.

Atrypina intermedia Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 157 (gen. ref.).

Silurian: Arisaig, Nova Scotia.

AULOCERIUM Parks.Genotype: *A. savagei* Parks.

Aulocerium Parks, Univ. Toronto Studies, Geol. Ser., 6, 1909, p. 44.

Aulocerium savagei Parks.

Aulocerium savagei Parks, Univ. Toronto Studies, Geol. Ser., 6, 1909, p. 44, pl. 18, figs. 13 and 15.

Niagaran: Wilmington, Illinois.

AULOCOPELLA Rauff.Genotype: *A. winnipegensis* Rauff.

Aulocopeella Rauff, Palæontographica, 41, 1895, p. 268.

Aulocopeella winnipegensis Rauff.

Aulocopeella winnipegensis Rauff, Palæontographica, 41, 1895, p. 269, fig. 124, pl. 24, figs. 4-6.—Whiteaves, Pal. Foss. Geol. Surv. Canada, 3, pt. 3, 1897, pp. 145, 146, fig. 9, pl. 16, figs. 1-3.

Black River or Richmond: Cat Head, Lake Winnipeg, Canada.

AULOCOPINA Billings.Genotype: *A. granti* Billings.

Aulocopina Billings, Canadian Nat., n. s., 7, 1874, p. 230.—Miller, N. A. Geol. Pal., 1889, p. 154.—Zittel-Eastman Textb. Pal., 1, 1900, p. 47; 2d ed., 1913, p. 53.

Aulocopina granti Billings.

Aulocopina Granti Billings, Canadian Nat., n. s., 7, 1874, p. 231, figs. 1, 2.—Walker, Jour. and Proc. Hamilton Assoc., 11, 1895, p. 86, fig. 2.

Niagaran dolomite: Hamilton, Ontario.

AULOPORA Goldfuss (part). See Stomatopora Bronn.**AULOPORA Goldfuss.**Genotype: *A. serpens* Goldfuss.

Aulopora Goldfuss, Petrefacta Germ., 1826, pp. 82, 245.—Fischer de Waldheim, Oryctographie Gouv. Moscou, 1837, p. 162.—Dana, Wilkes' U. S. Expl. Exped., 7, Zoophytes, 1842, p. 630.—McCoy, Syn. Foss. Carb. Ireland, 1844, p. 190.—King, Mon. Permian Foss. England, Pal. Soc., 1850, p. 31.—Edwards and Haime, Mono. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, pp. 159, 311.—Pictet, Traite de Pal., 2d ed., 4, 1859, p. 463.—Billings, Canadian Jour., n. s., 4, 1859, p. 118.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 319.—Koninck, Animaux Foss. Terr. Carb. Belgique (Mem. l'Acad. Royale Sci. de Belgique, 39), 1872, p. 148.—Nicholson, Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 42.—Nicholson, Trans. Royal Soc. Edinburgh, 27, 1876, p. 241.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 87.—Nicholson, Tab. Corals Pal. Period, 1879, p. 219.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 518.—Hall and Simpson, Pal. New York, 6, 1887, p. xi.—Miller, N. A. Geol. Pal., 1889, p. 173.—Beecher, Trans. Connecticut Acad. Arts and Sci., 8, 1891, p. 210.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 217.—Sardeson, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 10, 1896, p. 339.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 131.—Zittel-Eastman Textb. Pal., 1, 1900, p. 101.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 78.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 116.

AULOPORA ARACHNOIDEA Hall. See Stomatopora arachnoidea.**AULOPORA CONSIMILIS Lonsdale. See Berenicea consimilis.****AULOPORA FRONDOSA James. See Proboscina frondosa.**

***Aulopora precius* Hall.**

Aulopora precius Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875 (1877), pl. 9, figs. 5, 6; Mus. ed., 1879; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 227, pl. 8, figs. 5, 6.—Roemer, *Lethæa geog.*, pt. 1, Leth. Pal., 1883, p. 521.—Davis, *Kentucky Fossil Corals*, Geol. Surv. Kentucky, pt. 2, 1885, pl. 97, fig. 20.

Niagaran: Waldron, Indiana, etc. (Waldron); Louisville, Kentucky (Louisville).

***Aulopora precius compressus* Foerste.**

Aulopora precius compressus Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 339.

Upper Medinan (Brassfield): Ludlow Falls, Ohio.

***Aulopora pygmaea* Davis.**

Aulopora pygmaea Davis, *Kentucky Fossil Corals*, Geol. Surv. Kentucky, pt. 2, 1885, pl. 73, figs. 5, 6.

Niagaran (Louisville): Near Louisville, Kentucky.

AULOPORA REPENS* Roemer. See *Aulopora roemeri*.**Aulopora roemeri* Foerste.**

Aulopora repens Roemer (not Knorr and Walsh, 1775), Sil. Fauna West Tennessee, 1860, p. 28, pl. 2, fig. 1, la.

Aulopora roemeri Foerste, Jour. Geol., 11, 1903, p. 712.

Niagaran (Brownsport): Perry and Decatur Counties, Tennessee.

***Aulopora schoharie* Hall.**

Aulopora schoharie Hall, 26th Rep. New York State Mus., 1874, p. 110; 32d Rep. 1879, p. 142; Rep. New York State Geol. for 1882, 1883, pl. 2, figs. 1-6; Pal. New York, 6, 1887, p. 3, pl. 2, figs. 1-6.—Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 219, pl. 26, figs. 2, 3.

Helderbergian: Schoharie and Clarksville, New York (New Scotland); Hyndman, Pennsylvania (Keyser).

***Aulopora schucherti* Swartz.**

Aulopora schucherti Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 219, pl. 26, figs. 4, 5.

Helderbergian (Keyser): Keyser, West Virginia; Cash Valley, Hancock, etc., Maryland; Hyndman, Pennsylvania.

***Aulopora serpens* Owen.**

Aulopora serpens Owen (not Goldfuss, 1829), Geol. Expl. Iowa, Wisconsin, and Illinois, 2d ed., 1844, p. 78, pl. 14, fig. 2.

Niagaran: Iowa and Wisconsin.

***Aulopora*(?) *trentonensis* Winchell and Schuchert.**

Aulopora(?) *trentonensis* Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 95, pl. G, figs. 28-28.

Black River (Decorah): Minneapolis, near Cannon Falls, etc., Minnesota.

AULOPORA UMBELLIFERA* Billings. See *Romingeria umbellifera*.**Aulopora vanclevii* Hall.**

Aulopora Vanclevii Hall, 12th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 255, pl. 4, figs. 1, 2.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 67, figs.

Niagaran (Louisville): Falls of the Ohio.

***AUSTINELLA* Foerste. See *Plectorthis* subgenus *Austinella*.**

AVICULA Klein.Genotype: *A. hirundo* Klein.

Avicula Klein, *Ostrac.*, 1873.—McCoy, *Syn. Char. Foss.*, 1844, p. 82.—Woodward, *Man. Mollusca*, pt. 2, 1854, p. 260, pl. 16, fig. 18.—McCoy, *Brit. Pal. Rocks and Foss.*, 1854, p. 257.—Pictet, *Traite de Pal.*, 2d ed., 3, 1855, p. 597.—Zittel, *Handb. Pal.*, 2, Munich, 1881, p. 32.—Waagen, *Mem. Geol. Surv. India*, *Pal. Indica*, 13th ser., 1, 1881, p. 289.—Barrande, *Syst. Sil. Centre Boheme*, 6, 1881, p. 23.—Miller, *N. A. Geol. Pal.*, 1889, p. 463.—Jackson, *Amer. Nat.*, 24, 1890, p. 1141.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 187.

AVICULA ALATA Nicholson. See *Modiolopsis primigenia*.

AVICULA AVIFORMIS Conrad. See *Prolobella trentonensis*.

AVICULA CARINATA Emmons. See *Byssonychia carinata*.

AVICULA COMMUNIS Hall. See *Actinopteria communis*.

AVICULA CORRUGATA James. See *Pterinea corrugata*.

AVICULA DANBYI McCoy. See *Palæopecten danbyi*.

AVICULA DEMISSA Conrad. See *Pterinea demissa*.

AVICULA ELLIPTICA Hall. See *Prolobella subelliptica*.

AVICULA EMACERATA Conrad. See *Pterinea emacerata*.

***Avicula?? ferruginea* Conrad.**

Avicula ferruginea Conrad, *Proc. Acad. Nat. Sci. Philadelphia*, 3, 1846, p. 23, pl. 1, fig. 28.

Silurian (iron ore): Jersey Shore, Lycoming County, Pennsylvania.

AVICULA HERMIONE Billings. See *Prolobella? hermione*.

AVICULA HONEYMANI Miller. See *Pterinea honeymani*.

AVICULA INSUETA Emmons. See *Pterinea insueta*.

***Avicula lamellosa* Dawson.**

Avicula lamellosa Dawson, *Canadian Nat.*, n. s., 9, 1880, p. 342.

Silurian: Pictou, Nova Scotia.

AVICULA LEPTONOTA Hall. See *Pterinea emacerata*.

AVICULA LIMÆFORMIS Hall. See *Limoptera limæformis*.

AVICULA OBSCURA Hall. See *Pterinopecten? obscura*.

AVICULA? ORBICULATA Hall. See *Amphicælia orbiculoides*.

AVICULA RHOMBOIDEA Hall. See *Leptodesma rhomboidea*.

AVICULA RUGOSA Vanuxem. See *Pterinea subrugosa*.

AVICULA SECURIFORMIS Hall. See *Pterinea securiformis*.

AVICULA SUBARCUATA Emmons. See *Modiolopsis arcuata*.

AVICULA SUBELLIPTICA Emmons. See *Prolobella subelliptica*.

AVICULA SUBPLANA Hall. See *Leiopteria subplana*.

AVICULA SUBRECTA Hall. See *Pterinea subrecta*.

AVICULA SUBRETROFLEXA D'Orbigny. See *Pterinea demissa*.

AVICULA SUBRUGOSA D'Orbigny. See *Pterinea subrugosa*.

AVICULA TENUILAMELLATA Hall. See *Aviculopecten tenuilamellatus*.

AVICULA TRENTONENSIS Conrad. See *Prolobella trentonensis*.

Avicula triquetra Hall.

Avicula triquetra Hall, Nat. Hist. New York, Geol., 4, 1843, p. 137, fig. 7.

Niagaran (Guelph): Newark, Wayne County, New York.

AVICULA UNDATA Hall. See *Pterinea undata*.

Avicula? undosa Ringueberg.

Avicula undosa Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, 1886, p. 18, pl. 2, fig. 9.

Clinton (Rochester): Lockport, New York.

Avicula welchi James.

Not recognized.

Avicula welchi James, Cincinnati Quart. Jour. Sci., 1, 1874, p. 239.

Richmond: Clinton County, Ohio.

AVICULA WHITFIELDI Foerste. See *Cyrtodonta? ferruginea*.

AVICULOPECTEN McCoy.

Genotype: *A. planoradiatus* McCoy.

Aviculopecten McCoy, Ann. Mag. Nat. Hist., 2d ser., 7, 1851, p. 171, fig; Contr.

British Pal., 1854, p. 203, fig.; British Pal. Rocks and Foss., 1854, p. 392.—

Meek, Amer. Jour. Sci. and Arts, 2d ser., 37, 1864, p. 217.—Meek and Hay-

den, Pal. Up. Missouri, Smiths. Cont. Knowl., 172, 14, 1865, p. 49.—Meek,

Amer. Jour. Sci. and Arts, 2d ser., 44, 1867, p. 175; 44, 1868, p. 64.—Zittel,

Handb. Pal., 2, Munich, 1881, p. 30.—Waagen, Mem. Geol. Surv. India, Pal.

Indica, 13th ser., 1, 1881, p. 300.—Barrande, Syst. Sil. du Centre Boheme, 6,

1881, p. 22; *Acephales* Ext. Syst. Sil. du Centre Boheme, 1881, p. 34.—Hall,

Pal. New York, 5, pt. 1, Lam. (adv. copy), 1883, p. 3; 4th Rep. State Geol.

New York, 1885, p. 47, figs. 1, 2; 1st Rep. State Geol. New York, 1884, p. 12;

Pal. New York, 5, pt. 1, Lam. 1, 1884, p. xii; 35th Rep. New York State Mus.,

1884, p. 406b.—Miller, N. A. Geol. Pal., 1889, p. 465.—Koken, Die Leitfos-

silien, Leipzig, 1896, p. 185.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899,

p. 240.—Girty, Amer. Geol., 33, 1904, pp. 291, 292, fig.; 34, 1904, p. 332.—

Hind, *ibid.*, 34, p. 200.—Dall, Zittel-Eastman Textb. Pal., 2d ed., 1913,

p. 457.

AVICULOPECTEN SUBRECTUS Miller. See *Pterinea subrecta*.

Aviculopecten tenuilamellatus (Hall).

Avicula tenuilamellata Hall, Pal. New York, 3, 1859, p. 281, pl. 51, figs. 1 and 2.

Aviculopecten tenuilamellatus Maynard, Maryland Geol. Surv., Low. Dev., 1913,

p. 461, pl. 78, fig. 4.

Helderbergian: Albany and Schoharie Counties, New York (New Scotland);

Keyser, West Virginia (Keyser).

AZYGOGRAPTUS Nicholson.

Genotype: *A. lapworthi* Nicholson.

Azygograptus Nicholson, Ann. Mag. Nat. Hist., 4th ser., 16, 1875, p. 269.—Wiman,

Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, No. 4, 1896, p. 266; Nat. Sci., 9, 1896,

p. 188.—Elles, Quart. Jour. Geol. Soc. London, 54, 1898, p. 513.—Elles and

Wood, Mon. British Grapt. Pal. Soc., 1902, p. 92.—Ruedemann, Mem. New

York State Mus., 11, pt. 2, 1908, pp. 256-257.

Azygograptus? simplex Ruedemann.

Dawsonia campanulata Ruedemann (not Nicholson, 1873), Bull. New York State Mus., 42, 1901, p. 520.

Azygograptus? simplex Ruedemann, Mem. New York State Mus., 11, pt. 2, pp. 258-260, pl. 14, fig. 10, figs. 163-171.

Chazyan (Normanskill): Kenwood, Glenmont, Mount Moreno, and Lansingburg, New York.

Azygograptus? walcotti Lapworth.

Azygograptus? walcotti (Lapworth) Gurley, Jour. Geol., 4, 1896, pp. 69, 92.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 257, 258, fig. 162.

Chazyan (Normanskill): Stockport, New York.

BAIRDIA ANTICOSTIENSIS Jones. See *Krausella anticostiensis*.

BALANOCRINITES Troost. See *Lampterocrinus* Roemer.

BALANOCRINUS Hall. See *Lampterocrinus* Roemer.

BALTOCERAS Holm.

Genotype: *Endoceras burchardii* Dextz.

Baltoceras Holm, Geol. Mag., dec. 4, 4, 1897, p. 251.—Ruedemann, Bull. New York State Mus., 90, Pal., 14, 1906, p. 432.—Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 517.

Baltoceras(?) pusillum Ruedemann.

Baltoceras(?) pusillum Ruedemann, Bull. New York State Mus., 90, Pal. 14, 1906, p. 431, pl. 9, fig. 4, 5.

Canadian (Beekmantown): Valcour, New York.

BARRANDELLA Hall and Clarke. See *Clorinda* Barrande.

BARRANDEOCERAS Hyatt.

Genotype: *Nautilus natator* Billings.

Barrandeoceras Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 299.—Zittel, Handb. Pal., 2, Munich, 1884, p. 382.—Foord, Cat. Foss. Ceph. British Mus., 11, 1891, p. 77.—Hyatt, Proc. Amer. Philos. Soc., 32, 1894, p. 450.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 771.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 307.—Ruedemann, Bull. New York State Mus., 90, Pal. 14, 1906, p. 454.—Grabau and Shimer N. A. Index Fossils, 2, 1910, p. 65.

Barrandeoceras americanum (D'Orbigny).

Lituites convolvans (Hisinger?) Hall, Pal. New York, 1, 1847, p. 53, pl. 13, figs. 2, 2a.

Hortholus Americanus D'Orbigny, Prodr. de Pal., 1, 1849, p. 1 (new name for *Lituites convolvans* Hall).—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 146.

Lituites Americanus Miller, N. A. Geol. Pal., 1889, p. 442.

Barrandeoceras convolvans Hyatt, Proc. Amer. Philos. Soc., 32, 1894, p. 451.—Miller, N. A. Geol. Pal., sec. app., 1897, p. 771.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 66.

Barrandeoceras subcostulatum Whiteaves, Ottawa Naturalist, 12, 1898, p. 121; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 310, pl. 38.

Black River: Watertown, New York (Watertown); Wolfe Island, near Kingston, Canada.

BARRANDEOCERAS CONVOLVANS Hyatt. See *Barrandeoceras americanum*.

BARRANDEOCERAS ELRODI Milleri. See *Gyroceras elrodi*.

Barrandeoceras minganense Hyatt.

Barrandeoceras minganense Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 451.—

Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 309.

Chazyan (Mingan): Mingan Islands, Canada.

Barrandeoceras natator (Billings).

Nautilus natator Billings, Canadian Nat., 4, No. 6, 1859, p. 406.

Phragmoceras natator Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 638, 7 figs.

Barrandeoceras natator Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 299 (gen. ref.); Proc. Amer. Phil. Soc., 32, 1894, p. 452.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 308, pl. 39, figs. 1, 1a, 1b.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 66, fig. 1274.

Chazyan: Mingan Islands, Canada (Mingan); east shore of Valcour Islands, New York (Valcour).

BARRANDEOCERAS SUBCOSTULATUM Whiteaves. See *Barrandeoceras americanum*.

Barrandeoceras vagrans (Billings).

Gyroceras (Lituites) *vagrans* Billings, Geol. Surv. Canada Rep. Progr. for 1853–56, 1857, p. 308.

Barrandeoceras vagrans Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 311, pl. 40, figs. 1–2a.

Black River (Leray): La Petite Chaudiere Rapids, Ottawa River, and Montreal, Canada.

BARRANDEOCRINUS Angelin.

Genotype: *B. septrum* Angelin.

Barrandocrinus Angelin, Icon. Crin., 7, 1878, pl. 4, fig. 5, 5a; pl. 5, figs. 6, 6a; pl. 22, figs. 2–4.—Zittel, Handb. Pal., 1, 1879, p. 368.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1885, p. 347 (Rev. Pal., pt. 3, p. 125); Mem. Mus. Comp. Zool., Harvard, 21, 1897, p. 484.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 166, fig. 80.—Wachsmuth, Zittel-Eastman Pal., 1, 1900, p. 144.—Zittel, Grundzuge Pal., 1, 1910, p. 159.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 195.

Cylicocrinus Miller, N. A. Geol. Pal., 1st App., 1892, p. 676; 18th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1894, p. 285 (adv. sheets 1892).—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 156. (Genotype: *C. canaliculatus* Miller.)

Barrandocrinus canaliculatus (Miller).

Cylicocrinus canaliculatus Miller, 18th Ann. Rep. Dep. Geol. Nat. Res. Indiana (adv. sheets, 1892, p. 31, pl. 5, figs. 13, 14), 1894, p. 285, pl. 5, figs. 13, 14; N. A. Geol. Pal., 1st App., 1892, p. 676, fig. 1220.

Barrandocrinus canaliculatus Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 21, 1897, p. 485.

Niagaran (Laurel): St. Paul, Indiana.

Barrandocrinus? indianensis (Miller and Gurley).

Cylicocrinus (?) *indianensis* Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 6, 1895, p. 31, pl. 4, figs. 20–22.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 741, fig. 1331.

Niagaran (Laurel): St. Paul, Indiana.

BARRANDIA? MCCOYI Walcott. See *Dolichometopus mccoysi*.

BARYPHYLLUM Edwards and Haime.Genotype: *B. verneuileanum* Edwards and Haime.

Baryphyllum Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, pp. 165, 352.—Pictet, *Traité de Pal.*, 4, 1857, p. 453.—Milne-Edwards, *Hist. Nat. d. Corall.*, 3, 1860, p. 355.—Ludwig, *Paleontographica*, 14, 1865, p. 143, pl. 31, figs. 11, 11a.—Dybowski, *Archiv f. Natur. Liv., Ebst- und Kurl.*, 5, 1873, p. 334.—Zittel, *Handb. Pal.*, 1, Munich, 1879, p. 227.—Roemer, *Leth. geog.*, pt. 1, Leth. Pal., 1883, p. 372.—Miller, N. A. Geol. Pal., 1889, p. 174.—Sherzer, *Amer. Geol.*, 7, 1891, pp. 278-283.

Baryphyllum fungulus White.

Baryphyllum fungulus White, Proc. Acad. Nat. Sci. Philadelphia, 1878, p. 29. Niagaran (Waldron) Waldron, Indiana.

BASILICUS Salter.Genotype: *Asaphus tyrannus* Murchison.

Basilicus Salter, Mem. Geol. Surv. United Kingdom, dec. 2, 1849, pl. 5.—McCoy, *Ann. Mag. Nat. Hist.* (2), 4, 1849, p. 399; *Brit. Pal. Rocks and Fossils*, 1854, p. 169.—Salter, Mon. Brit. Tril., Pal. Soc., 1866, p. 146.—Zittel, *Handb. Pal.*, 2, 1885, p. 608.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 26.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 8th ser., 6, 1898, p. 29; 12, No. 8, 1901, p. 1; 14, No. 10, 1904, pp. 3-20.—Raymond, *Ann. Carnegie Mus.*, 7, No. 1, 1910, p. 62; *Trans. and Proc. Roy. Soc. Canada*, 5, 3d ser., sec. 4, 1912, p. 115; *Zittel-Eastman Textb. Pal.*, 1913, p. 719.

Basilicus barrandi (Hall).

Asaphus Barrandi Hall, Geol. Lake Superior Land Dist., Foster and Whitney's Rep., 1851, p. 210, pl. 27, figs. 1a-d; pl. 28; Rep. Geol. Surv. Wisconsin, 1862, p. 41, fig. 4.

Ogygia barrandii Whitfield, *Amer. Mus. Nat. Hist.*, 2, pt. 1, 1898, p. 70.

Asaphus Romingeri Walcott, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, p. 96; mus. ed., 1879, p. 96.

Ptychopyge romingeri Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 709.

Basilicus romingeri Raymond, *Ann. Carnegie Mus.*, 7, No. 1, 1910, p. 49, pl. 15, figs. 9, 10; pl. 16, figs. 1-4.

Asaphus Wisconsinensis Walcott, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, p. 97; mus. ed., 1879, p. 97.

Ptychopyge ulrichi Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 709, figs. 12, 13.

Asaphus ulrichi Miller, N. A. Geol. Pal., 2d App., 1897, p. 786 (gen. ref.).

Basilicus barrandi Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 42; Bull. Mus. Comp. Zool., 58, 1914, p. 261, pl. 1, figs. 4, 5; pl. 2, figs. 1, 7.

Black River: Platteville, etc., Wisconsin; Russia, Herkimer County, New York; Cannon Falls and Faribault, Minnesota; Ottawa, Ontario; St. Joseph's Island, Lake Huron.

BASILICUS CANADENSIS Chapman. See *Ogygites canadensis*.

Basilicus huttoni (Billings).

Asaphus Huttoni Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 271, fig. 256.

Ptychopyge huttoni Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 710.

Asaphus morriaii Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 272, fig. 257.—Vogdes, Bull. U. S. Geol. Surv., 63, 1890, pp. 93, 94.

Chazy (Quebec—N, P): Tablehead and four miles northeast Portland Creek, Newfoundland.

Basilicus marginalis (Hall).

Asaphus marginalis Hall, Pal. New York, 1, 1847, p. 24, pl. 4 (bis.), fig. 15.—Emmons, *Amer. Geol.*, 1, pt. 2, 1855, p. 235, pl. 3, fig. 16.—Raymond, *Ann. Carnegie Mus.*, 3, 1905, p. 339, pl. 10, figs. 17-20; pl. 11.—Grabau and Shimer, N. A. Index Foss., 2, 1910, p. 291, fig. 1599.

Basiliscus marginalis—Continued.

Basiliscus marginalis Raymond, 7th Rep. State Geol. Vermont, 1910, p. 220, pl. 32, figs. 17–20; pl. 34, figs. 8–10; pl. 37, fig. 6; pl. 39, figs. 1–2; Ann. Carnegie Mus., 7, No. 1, 1910, p. 62, fig. 1; pl. 17, fig. 6; pl. 19, figs. 1, 2.

Asaphus alpha Raymond, Ann. Carnegie Mus., 3, 1905, p. 342, pl. 12, fig. 9.

Asaphus gamma Raymond, Ann. Carnegie Mus., 3, 1905, p. 342, pl. 12, fig. 10.

Chazy (Day Point, Crown Point): Chazy, Valcour Island, etc., New York.

Observation.—See also *Gerasaphes ulrichana* Ruedemann (not Clarke) for a possible synonym.

Basiliscus? vetustus (Hall).

Ogygia? vetusta Hall, Pal. New York, 1, 1847, p. 227, pl. 60, fig. 1.—Emmons, Amer. Geol., 1, pt. 2, 1855, p. 216, fig. 72.

Asaphus vetustus Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 72 (gen. ref.).

Black River (Lowville): Mohawk Valley, New York.

BATHYCELLA Foerste. See *Pianodema* Foerste.**BATHYURELLUS** Billings.

Genotype: *Bathyurellus abruptus* Billings.

Bathyurellus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, pp. 262, 263.—Walcott, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, p. 94, footnote; mus. ed., 1879.—Dames, Richthofen's China, Berlin, 4, 1883, p. 5.—Zittel, Handb. Pal., 2, 1885, p. 602.—Miller, N. A. Geol. Pal., 1889, p. 533.—Raymond, Ann. Carnegie Mus., 3, No. 2, 1905, p. 337; Zittel-Eastman Textb. Pal., 1913, p. 718.

Bathyurellus abruptus Billings.

Bathyurellus abruptus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 263, fig. 247 (?250).

Canadian (Quebec—F, G, H): Port aux Choix and Keppel Island, Newfoundland.

Bathyurellus brevispinus Raymond.

Bathyurellus brevispinus Raymond, Ann. Carnegie Mus., 3, 1905, p. 337, pl. 10, figs. 13–15; 7th Rep. State Geol. Vermont, 1910, p. 218, pl. 32, figs. 13–15.

Chazy: Three miles east of Chazy, New York (Day Point); Mingan Islands, Canada (Mingan).

Bathyurellus expansus Billings.

Bathyurellus expansus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 318, fig. 306a, b.

Canadian (Beekmantown): Stanbridge, Quebec.

Bathyurellus formosus Billings.

Bathyurellus formosus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 206, fig. 250.

Chazy (Quebec—P): Cow Head, Newfoundland.

Observation.—Compare *Bathyurellus brevispinus* Raymond.

Bathyurellus fraternus Billings.

Bathyurellus fraternus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 267, fig. 251, a, b.

Chazy: Cow Head, Newfoundland (Quebec—P); Mingan Islands, Canada (Mingan).

Bathyurellus litoreus Billings.

Bathyurellus litoreus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 320.

Ozarkian? (Levis-erratic): Point Levis, Quebec.

Bathyurellus marginatus Billings.

Bathyurellus marginatus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 264, fig. 248 (?249).

Canadian (Quebec—F, G, H): Keppel Island, Port aux Choix, and Table Head, Newfoundland.

Bathyurellus minor Raymond.

Bathyurellus minor Raymond, Annals Carnegie Mus., 3, 1905, p. 338, pl. 10, fig. 16; 7th Rep. State Geol. Vermont, 1910, p. 219, pl. 32, fig. 16.

Bathyurellus validus Raymond, Bull. Amer. Pal., 3, No. 14, 1902, p. 301.

Chazy (Crown Point): Crown Point, Valcour Island, New York.

Bathyurellus nitidus Billings.

Bathyurellus nitidus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 265, fig. 249.—Miller, N. A. Geol. Pal., 1889, p. 533, fig. 971.

Chazy (Quebec—P): Cow Head, Newfoundland.

Bathyurellus rarus Billings.

Bathyurellus rarus Billings, Pal. Foss., 1, Geol. Surv., Canada, 1865, p. 320.

Ozarkian? (Levis-erratic): Point Levis, Quebec.

Bathyurellus validus Billings.

Bathyurellus validus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 268, fig. 252. Chazy (Quebec—L): Point Rich, Newfoundland.

BATHYURUS Billings.

Genotype: *Asaphus extans* Hall.

Bathyrus Billings, Canadian Nat. Geol., 4, 1859, p. 364; 5, 1860, p. 317; Pal. Foss., 1, Geol. Surv. Canada, 1865, pp. 408, 409.—Walcott, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, p. 94; mus. ed., 1879.—Kayer, Beitr. Geol. and Pal. Argentinischen Republik, Palaeontographica Suppl., 3, 1876, p. 10.—Dames, Richthofen's China, 4, 1883, p. 4.—Zittel, Handb. Pal., 2, 1885, p. 602.—Miller, N. A. Geol. Pal., 1889, p. 533.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 288.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 718; Bull. Victoria Mem. Mus., 1, 1913, p. 51.

Bathyrus acutus Raymond.

Bathyrus acutus Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 56, pl. 7, fig. 4. Stones River (Pamelia): Westboro, near Ottawa, Ontario.

Bathyrus amplimarginatus Billings.

Bathyrus amplimarginatus Billings, Canadian Nat. Geol., 4, 1859, p. 365, fig. 12a, b; Geol. Canada, Geol. Surv. Canada, 1863, p. 122, fig. 41; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 353, fig. 341a.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 288.—Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 54.

Bathyrus minganensis Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 353. Canadian: Mingan Islands, Canada (Romaine); Rockland, Ontario, (Beekmantown).

Bathyrus angellini Billings.

Bathyrus Angelini Billings, Canadian Nat. Geol., 4, 1859, p. 467, fig. 37; Geol. Canada, Geol. Surv. Canada, 1863, p. 133, fig. 68.—Chapman, Canadian Jour., n. s., 8, 1863, p. 29, fig. 142; p. 195, fig. 166; Expos. Min. Geol. Canada, 1864, p. 137, fig. 142; p. 167, fig. 166.—Raymond, Ann. Carnegie Mus., 3, 1905, No. 2, p. 335, fig. 1, pl. 10, figs. 11, 12; 7th Rep. State Geol. Vermont, 1910, pl. 32, figs. 11, 12; Bull. Victoria Mem. Mus., 1, 1913, p. 55, pl. 7, fig. 5.

Canadian: Grenville (Beekmantown), Mingan Islands (Romaine), etc., Canada.

Bathyurus arcuatus Billings.

Bathyurus arcuatus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 205, figs. 189, 190.—Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 57.

Canadian (Beekmantown): Near St. Antoine, above Quebec, Canada.

BATHYURUS ARMATUS Billings. See *Plethopeltis armatus*.

BATHYURUS ARMATUS Walcott. See *Plethopeltis saratogensis*.

BATHYURUS BITUBERCULATUS Billings. See *Lloydia bituberculatus*.

BATHYURUS BREVICEPS Billings. See *Leiostegium breviceps*.

BATHYURUS CAPAX Billings. See *Platycolpus capax*.

BATHYURUS CAUDATUS Billings. See *Goniurus caudatus*.

BATHYURUS CONGENERIS Walcott. See *Holasaphus congeneris*.

BATHYURUS CONICUS Billings. See *Hystericurus conicus*.

BATHYURUS CORDAI Billings. See *Hystericurus cordai*.

BATHYURUS CROTALIFRONS Dwight. See *Hystericurus crotalifrons*.

BATHYURUS CYBELE Billings. See *Petigurus cybele*.

Bathyurus?? darwini Kayser.

Bathyurus? *Darwini* Kayser, Beitr. Geol. Pal. Argentinischen Republik, Palaeontographica Suppl., 3, 1876, p. 12, pl. 2, fig. 6.

Ordovician: Quebrada de Juan Pobre, Argentina.

BATHYURUS DUBIUS Billings. See *Platycolpus dubius*.

BATHYURUS ELLIPTICUS Cleland. See *Petigurus ellipticus*.

Bathyurus extans (Hall).

Asaphus? *extans* Hall, Pal. New York, 1, 1847, p. 228, pl. 60, figs. 2, 2a-c; 3d Rep. New York State Cab. Nat. Hist., rev. ed., 1850, p. 182, pl. 3, fig. 1 (doc. ed., p. 174).—Emmons, Amer. Geology 1, pt. 2, 1855, pl. 15, figs. 8, 11.

Asaphus? *nodostriatus* Hall, Pal. New York, 1, 1847, p. 248, pl. 61, figs. 1a, b.

Bathyurus extans Billings, Canadian Nat. Geol., 4, 1859, p. 364; Geol. Canada, Geol. Surv. Canada, 1863, p. 153, fig. 114.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 722, fig. 37.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 288, fig. 1594.—Raymond, Ann. Carnegie Mus., 7, No. 1, 1910, p. 46, pl. 15, figs. 7, 8; pl. 16, fig. 5; Bull. Victoria Mem. Mus., 1, 1913, p. 52.

Black River: Mohawk Valley, near Watertown, etc., New York; Ottawa and Mingan Islands, Canada; Minnesota, Wisconsin, Kentucky.

Bathyurus glandicephalus Whitfield.

Bathyurus (*Bathyurellus*) *glandicephalus* Whitfield, Bull. Amer. Mus. Nat. Hist., 3, 1890, p. 38, pl. 2, figs. 9-12.

Bathyurus glandicephalus Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 55.

Canadian (Beekmantown): Shoreham, Vermont; Champlain Valley.

Bathyurus ingalli Raymond.

Bathyurus ingalli Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 57, pl. 7, fig. 7.

Trenton (Curdsville): Two miles north Kirkfield, Belleville, and near Ottawa, Ontario.

Bathyrurus johnstoni Raymond.

Bathyrurus johnstoni Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 53, pl. 7, figs. 2, 3.

Black River (Lowville): Carden, Ottawa, and west of Mechanicsville, Ontario.

Bathyrurus? lajensis Kayser.

Bathyrurus? lajensis Kayser, Beitr. Geol. and Pal. Argentinischen Republik, Palaeontographical Suppl. 3, 1876, p. 12, pl. 2, fig. 5.

Ordovician: Quebrada de la Laja, Argentina.

BATHYURUS LEVIS Cleland. See *Symphysurus convexus*.

Bathyrurus longispinus Walcott.

Bathyrurus longispinus Walcott, 28th Ann. Rep. New York State Mus., 1879, p. 94.—Raymond, Ann. Carnegie Mus., 7, No. 1, 1910, p. 47, pl. 16, figs. 12-14; Zittel-Eastman Textb. Pal., 1913, p. 718, fig. 1381; Bull. Victoria Mem. Mus., 1, 1913, p. 54.

Ptychopyge jerseyensis Weller, Pal. New Jersey, 3, 1903, p. 193, pl. 14, fig. 16.

Black River: Newport, New York; Jacksonburg, New Jersey.

BATHYURUS MINGANENSIS Billings. See *Bathyrurus amplimarginatus*.

BATHYURUS NERO Billings. See *Petigurus nero*.

BATHYURUS OBLONGUS Billings. See *Lloydia oblongus*.

Bathyrurus? orbignyanus Kayser.

Bathyrurus? Orbignyanus Kayser, Beitr. Geol. and Pal. Argentinischen Republik, Palaeontographical Suppl. 3, 1876, p. 12, pl. 2, figs. 7, 8.

Ordovician: Quebrada de Juan Pobre, Argentina.

Bathyrurus perkinsi Whitfield.

Bathyrurus perkinsi Whitfield, Bull. Amer. Mus. Nat. Hist., 9, 1897, p. 183, pl. 5, figs. 7, 8.—Seely, 7th Rep. State Geol. Vermont, 1910, pl. 55, figs. 7, 8.

Canadian (Beekmantown): Mouth of Otter Creek, Vermont.

Bathyrurus perplexus Billings.

Bathyrurus perplexus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 364, fig. 350.—Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 52.

Middle Ordovician? Bonne Bay, Newfoundland.

Observation.—Probably the same as *B. extans*.

BATHYURUS PERSPICATOR Billings. See *Goniurus perspicator*.

Bathyrurus pogonipensis Hall and Whitfield.

Bathyrurus Pogonipensis Hall and Whitfield, U. S. Geol. Expl. 40th Parl., 4, 1877, p. 243, pl. 1, figs. 33, 34.

Lower Pogonip: West side Pogonip Mountain, White Pine District, Nevada.

Holotype.—Cat. No. 24655, U.S.N.M.

BATHYURUS QUADRATUS Billings. See *Leiostegium quadratus*.

BATHYURUS SAFFORDI Billings. See *Lloydia saffordi*.

Bathyrurus schucherti Clarke.

Bathyrurus schucherti Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 724, figs. 41, 42.—Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 58.

Black River (Platteville): Minneapolis, Minnesota.

Cotype.—Cat. No. 43052, U.S.N.M.

BATHYURUS SEELYI Whitfield. See *Bolbocephalus seelyi* and *Hystericurus cordai*.

Bathyurus(?) similimus Walcott.

Bathyurus? similimus Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 93, pl. 12, fig. 11.

Upper Pogonip: White Mountain, Eureka District, Nevada.

Holotype: Cat. No. 24653, U.S.N.M.

BATHYURUS SMITHI Billings. See *Haploconus smithi*.

BATHYURUS SOLITARIUS Billings. See *Lloydia solitarius*.

Bathyurus spiniger (Hall).

Acidaspis spiniger Hall, Pal. New York, 1, 1847, p. 241, pl. 64, fig. 5.

Bathyurus spiniger Clarke, Geol. Minnesota, 3, pt. 2, 1884, p. 723, figs. 38-40.—

Raymond, Bull. Amer. Pal., 3, 1902, pl. 19, figs. 1-3; Ann. Carnegie Mus., 7,

1910, p. 48, pl. 15, figs. 4-6.—Grabau and Shimer, N. A. Index Fossils, 2,

1910, p. 288.—Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 57.

Black River: Mohawk Valley, New York; Montreal, Quebec; Illinois, Kentucky, Missouri, Iowa.

Pteriotype.—Cat. Nos. 41932, 41933, U. S.N.M.

BATHYURUS STONEMANI Vogdes. See *Prætus stonemani*.

BATHYURUS STRENUUS Billings. See *Lloydia strenuus*.

Bathyurus superbus Raymond.

Bathyurus superbus Raymond, Ottawa Nat., 24, 1910, p. 129, pl. 2, figs. 1-3; Bull.

Victoria Mem. Mus., 1, 1913, p. 54.

Black River: Near Ottawa, Ontario.

Bathyurus? taurifrons Dwight.

Bathyurus taurifrons Dwight, Amer. Jour. Sci., 3d ser., 27, 1884, p. 252, pl. 7, figs. 1, 1a-3.

Canadian (Beekmantown): Rochdale County, New York.

Bathyurus? timon Billings.

Bathyurus Timon Billings, Pal. Foss., 1, Geol. Surv. Canada, p. 261, fig. 244.

Canadian (Quebec-G, H): Port aux Choix, Newfoundland.

BATHYURUS TUBERCULATUS Walcott. See *Hystericurus tuberculatus*.

Bathyurus? vetulus Billings.

Bathyurus vetulus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 365.

Middle Ordovician: East arm of Bonne Bay, Newfoundland.

BATOSTOMA? Ulrich.

Genotype: *Monticulipora (Heterotrypa) implicata* Nicholson.

Batostoma Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 154.—Foord,

Contr. Micro-Pal. Cambro-Sil., 1883, p. 17.—Miller, N. A. Geol. Pal., 1889,

p. 294.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 379, 459; Geol. Minnesota,

3, 1893, p. 288; Zittel's Textb. Pal. (Engl. ed.), 1897, p. 275.—Simpson, 14th

Ann. Rep. State Geol. New York for 1894, 1897, p. 588.—Nickles and Bassler,

Bull. U. S. Geol. Surv., 173, 1900, p. 35.—Grabau and Shimer, N. A. Index

Fossils, 1, 1907, p. 136.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana,

1908, p. 740.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 272; Zittel-Eastman

Textb. Pal., 1913, p. 338.

Batostoma canadense (Foord).

Amplexopora Canadensis Foord, Contr. Micro-Pal. Cambro-Sil., 1883, p. 17, pl. 4, figs. 2-2d.

Batostoma Canadensis Ulrich, Geol. Minnesota, 3, 1893, p. 317.

Mohawkian: St. Joseph Island, Lake Huron (Black River); Joliette, Quebec (?Trenton).

Batostoma? decipiens Ulrich.

Batostoma? decipiens Ulrich, Geol. Minnesota, 3, 1893, p. 298, pl. 27, figs. 16-19.

Black River (Decorah): Minneapolis, Minnesota.

Holotype.—Cat. No. 43511, U.S.N.M.

Batostoma fertile Ulrich.

Batostoma fertilis Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 92; Geol. Minnesota, 3, 1893, p. 290, pl. 25, figs. 1-11; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 275, fig. 459A.—Sardeson, Jour. Geol., 9, 1901, p. 12.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 136, fig. 188k, 190l.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 274, 275, fig. 163.

Black River (Decorah): Minneapolis, Minnesota, and vicinity.

Ordovician (Echinospherites limestone): Near Reval, Esthonia, Russia.

Cotypes.—Cat. No. 43505, U.S.N.M.

Batostoma fertile circulare Ulrich.

Batostoma fertile var. *circulare* Ulrich, Geol. Minnesota, 3, 1893, p. 291, pl. 25, figs. 8, 9.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 275, 276, fig. 164; Zittel-Eastman Textb. Pal., 1913, p. 338, fig. 492b.

Batostoma fertile Ulrich, Zittel's Textb. Pal. (Eng. ed.), 1896, p. 275, fig. 459B.

Black River (Decorah): Minneapolis, Minnesota, and vicinity.

Ordovician (Echinospherites limestone): Near Reval, Esthonia, Russia.

Holotype.—Cat. No. 43506, U.S.N.M.

Batostoma humile Ulrich.

Batostoma humile Ulrich, Geol. Minnesota, 3, 1893, p. 294, pl. 25, figs. 29-36.

Trenton (Prosser): St. Paul and Cannon Falls, Minnesota; Decorah, Iowa.

Cotypes.—Cat. No. 43509, U.S.N.M.

BATOSTOMA IMPERFECTUM Ulrich. See *Hemiphragma imperfectum*.**Batostoma implicatum** (Nicholson).

Chaetetes implicata Ulrich, Cat. Foss. Cincinnati Group, 1880, p. 12 (not defined).

Monticulipora (Heterotrypa) *implicata* Nicholson, Genus *Monticulipora*, 1881, p. 147, pl. 2, figs. 7, 7e.

Monticulipora implicatum J. F. James, Jour. Cincinnati Soc. Hist., 16, 1894, p. 198.

Batostoma implicatum Ulrich, *ibid.*, 5, 1882, p. 256; 7, 1883, p. 83.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 178.—Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 48, pl. 2, fig. 6.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 774, pl. 7, fig. 7; pl. 8, fig. 2.

Alecto nexilis James, Intr. Cat. Foss. Cincinnati Group, 1875, p. 3.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 10.

Ceramopora? irregularis James, Paleontologist, No. 1, 1878, p. 5 (part).—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 26.

Eden: Cincinnati, Ohio, and vicinity.

BATOSTOMA IRRASA Ulrich. See *Hemiphragma irrasum*.**Batostoma jamesi** (Nicholson).

Chaetetes Jamesi Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 506, pl. 29, figs. 10, 10b; Pal. Ohio, 2, 1875, p. 200, pl. 21, figs. 11, 11a; Ann. Mag. Nat. Hist., 4th. ser., 18, 1876, p. 89.

Batostoma jamesi—Continued.

Monticulipora Jamesi Nicholson, Ann. Mag. Nat. Hist., 5th ser., 6, 1880, p. 415, fig. 3A, B, fig. 4.—(Van Cleve) Hall, 12th Rep. Indiana Geol. Nat. Hist., 1883, p. 248, pl. 11, fig. 8.—James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 176.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 421, figs.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 197.

Monticulipora (Heterotrypa) Jamesi Nicholson, Genus *Monticulipora*, 1881, p. 143, figs. 25, 26.

Batostoma jamesi Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 256; 6, 1883, p. 83.—Miller, N. A. Geol. Pal., 1889, p. 294, fig. 457.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 775, pl. 7, figs. 8, 8a; pl. 8, fig. 1, pl. 27, figs. 6, 6a.

Ceramopora irregularis James, Paleontologist, No. 1, 1878, p. 5 (part).—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 26.

Eridotrypa vevayensis Cumings, Amer. Geol., 28, 1901, p. 376, pl. 35, figs. 7, 8. Eden: Cincinnati, Ohio, and vicinity.

Observation.—The type specimen of *Eridotrypa vevayensis* was found to be an example of *Batostoma jamesi* in which the mesopores were fewer than usual, thus making the zoecia more angular. *Ceramopora irregularis* James was based on incrusting forms of both *Batostoma jamesi* and *B. implicatum*.

Batostoma libana (Safford).

Stenopora libana Safford, Geol. Tennessee, 1869, p. 285.

Stones River (Lebanon): Lebanon, Tennessee.

Observation.—Although not sufficiently described for recognition, this species is known to be a characteristic fossil of the Lebanon limestone.

Batostoma magnopora Ulrich.

Batostoma magnopora Ulrich, Geol. Minnesota, 3, 1893, p. 291, pl. 25, figs. 12–15.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 272–274, figs. 161, 162.

Black River (Decorah): Minneapolis, Minnesota, and vicinity.

Ordovician (Wassaleum): Uxnorm, Esthonia, Russia.

Cotypes and *pleriotype*.—Cat. Nos. 43508, 57377, U.S.N.M.

Batostoma manitobense Ulrich.

Batostoma Manitobense Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 33; pl. 9, figs. 3–3c.—Whiteaves, Pal. Foss., 3, 1895, p. 117.

Richmond (Stony Mountain): Stony Mountain, Manitoba; Wyoming.

Sections of *cotypes*.—Cat. No. 43250, U.S.N.M.

Batostoma maysvillense Nickles.

Batostoma maysvillensis Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 51, pl. 2, figs. 13, 14.

Maysville (Mount Hope): Near Maysville, Kentucky.

Batostoma minnesotense Ulrich.

Amplexopora superba Ulrich (not Foord), 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1881, p. 92.

Batostoma minnesotense Ulrich, Geol. Minnesota, 3, 1893, p. 297, pl. 26, figs. 38–40, pl. 27, figs. 9–15.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 588, fig. 173.

Black River (Decorah): Minneapolis, St. Paul, etc., Minnesota.

Cotypes.—Cat. No. 43507, U.S.N.M.

Batostoma montuosum Ulrich.

Batostoma montuosum Ulrich, Geol. Minnesota, 3, 1893, p. 293, pl. 25, figs. 26–28.

Black River (Decorah): Cannon Falls, Minnesota.

Holotype.—Cat. No. 45312, U.S.N.M.

BATOSTOMA OTTAWAENSE Foord. See *Hemiphragma ottawaense*.

Batostoma prosseri Cumings and Galloway.

Batostoma prosseri Cumings and Galloway, Proc. Indiana Acad. Sci., 1912, p. 151, pl. 5, figs. 1-1c; pl. 6, figs. 1-1d; pl. 7, figs. 2-2c.

Richmond (Upper Waynesville and Lower Liberty): Weisburg, Indiana.

Batostoma? rugosum (Whitfield).

Fistulipora rugosa Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1879, 1880, p. 60; Geol. Surv. Wisconsin, 4, 1882, p. 255, pl. 11, figs. 20, 21.

Batostoma rugosum Miller, N. A. Geol. Pal., 1889, p. 294.

Richmond (Maquoketa): Delafield, Wisconsin.

Batostoma sevieri Bassler.

Batostoma sevieri Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, pl. 21, figs. 1-3.

Chazy (Ottoese): Speer Ferry, Virginia; Knoxville, Tennessee, etc.

Cotypes.—Cat. No. 56630, U.S.N.M.

Batostoma superbum (Foord).

Amplexopora superba Foord, Contr. Micro-Pal. Cambro-Sil., 1883, p. 16, pl. 4, figs. 1-1c.

Batostoma superbum Ulrich, Geol. Minnesota, 3, 1893, p. 297.

Trenton: Montreal, Quebec.

BATOSTOMA (HEMIPHFRAGMA) TENUIMURALE Grabau and Shimer. See *Hemiphragma tenuimurale*.

BATOSTOMA VARIABLE (part) Ulrich. See *Batostoma varians*.

Batostoma variable Ulrich.

Batostoma variable Ulrich (part), Geol. Surv. Illinois, 8, 1890, p. 460, pl. 35, fig. 5; pl. 36, fig. 1 (not pl. 35, figs. 4b, c=B. varians).—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 18, pl. 7, figs. 9, 10.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 777, pl. 8, fig. 4; pl. 26, fig. 13.—Cumings and Galloway, Proc. Indiana Acad. Sci., 1912, p. 150, pl. 2, figs. 1-1c; pl. 3, figs. 1-1c; pl. 4, figs. 1, 1a, pl. 7, figs. 1-1c.

Richmond (Whitewater): Versailles, Richmond, etc., Indiana; Ohio.

Cotypes and pleiotype.—Cat. Nos. 43820, 44777, U.S.N.M.

Batostoma varians (James).

Chaetetes varians James, Paleontologist, No. 1, 1878, p. 2.

Monticulipora (Chaetetes) varians James, Paleontologist, No. 5, 1881, p. 36.

Monticulipora varians James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 177, pl. 2, figs. 4a, b.—J. F. James, *ibid.*, 16, 1894, p. 199.

Batostoma variabile (part) Ulrich, Geol. Surv. Illinois, 8, 1890, p. 460, pl. 35, figs. 4b-c, (Not 4, 4a, 5, or pl. xxxvi, pt. 1=B. variabile).—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 200.

Batostoma varians Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 179.—Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 57, pl. 3, figs. 8, 9.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 18.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 778, pl. 7, fig. 9; pl. 8, figs. 3, 3b; pl. 26, fig. 14.—Cumings and Galloway, Proc. Indiana Acad. Sci., 1912, p. 148, pl. 1, figs. 1-1e; pl. 7, figs. 3, 3a.

Richmond: Blanchester, Clarksville, etc., Ohio; Richmond, Versailles, etc., Indiana (Arnheim-Liberty); Savannah, Illinois, and Delafield, Wisconsin (Maquoketa).

Batostoma varium Ulrich.

- Batostoma varium* Ulrich, Geol. Minnesota, 3, 1893, p. 292, pl. 25, figs. 16-25.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 588, fig. 175 (not fig. 176=*Eridotrypa mutabilis*).
 Black River (Decorah): Minneapolis and St. Paul, Minnesota.
 Chazyan (Mingan): Mingan Islands, Canada.
Cotypes.—Cat. No. 43510, U.S.N.M.

BATOSTOMA (HEMIPHAGMA) WHITFIELDI Grabau and Shimer. See *Hemiphragma whitfieldi*.**Batostoma winchelli** (Ulrich).

- Amplexopora winchelli* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 91.
Batostoma winchelli Ulrich, Geol. Minnesota, 3, 1893, 295, pl. 26, figs. 33-37, pl. 27, figs. 1-6.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 588, fig. 174.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 136, fig. 188j, 190j.—Baesler, Bull. U. S. Nat. Mus., 77, 1911, pp. 278, 279, fig. 166.
 Black River (Decorah): Minneapolis, Minnesota, and vicinity; Lake Nipissing, Ontario.
 Ordovician (Weenberg): Weenberg, Esthonia, Russia.
Cotypes.—Cat. No. 43815, U.S.N.M.

Batostoma winchelli nodosum Ulrich.

- Batostoma winchelli* var. *nodosum* Ulrich, Geol. Minnesota, 3, 1893, p. 295, pl. 26, fig. 35.
 Black River (Decorah): Minneapolis and St. Paul, Minnesota.

Batostoma winchelli spinulosum Ulrich.

- Batostoma winchelli* var. *spinulosum* Ulrich, Geol. Minnesota, 3, 1893, p. 296, pl. 27, figs. 7, 8; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 275, fig. 459C.—Baesler, Bull. U. S. Nat. Mus. 77, 1911, pp. 279-280, figs. 167, 168.
 Black River (Decorah): Minneapolis and St. Paul, Minnesota.
 Ordovician (Wassaleum): Uxnorm, Esthonia, Russia.
Plesiotype.—Cat. No. 57383 U.S.N.M.

BATOSTOMELLA Ulrich.Genotype: *B. spinulosa* Ulrich.

- Batostomella* Ulrich (in part), Jour. Cincinnati Soc. Nat. Hist., 5, 1882, pp. 141, 154.—Miller, N. A. Geol. Pal., 1889, p. 294.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 375, 432.—Rominger, Amer. Geol., 6, 1890, p. 119.—Whidborne, Devon. Fauna England, Pal. Soc., 2, 1895, pt. 4, p. 187.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 277.—Nickles and Baesler, Bull. U. S. Geol. Surv., 173, 1900, pp. 32, 180.—Grabau, Bull. New York State Mus., 45, 1901, p. 164; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 164.—Condra, Nebraska Geol. Surv., 2, pt. 1, 1903, p. 38.—Baesler, Bull. U. S. Geol. Surv., 292, 1906, p. 28.—Grabau and Shimer, N. A. Index Foss., 1, 1907, p. 133.—Baesler, Zittel-Eastman Textb. Pal., 1913, p. 335.
Geinitzella Waagen and Wentzel, Pal. Indica, ser., 13, 1886, pp. 875, 880.—Zittel, Textb. Pal. (Engl. ed.), 1896, p. 105.

BATOSTOMELLA (part) Ulrich. See *Eridotrypa* Ulrich.**BATOSTOMELLA ANNULIFERA** Ulrich. See *Lioclemella annulifera*.**BATOSTOMELLA? ASPERA** Nickles and Baesler. See *Acanthoclema asperum*.**BATOSTOMELLA GRACILIS** Ulrich. See *Bythopora gracilis*.

Batostomella granulifera (Hall).

Trematopora granulifera Hall, Pal. New York, 2, 1852, p. 154, pl. 40 A, figs. 9a-e; *28th Ann. Rep. New York State Mus. (doc. ed.), 1876, pl. 11, figs. 6, 7; (mus. ed.), 1879, p. 112, pl. 11, figs. 6, 7; *11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 233, pl. 10, figs. 6, 7.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1200, figs.

Rhombopora granulifera Ulrich, Geol. Surv. Illinois, 8, 1890, p. 647.

Batostomella granulifera Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 180 (gen. ref.).—Grabau, Bull. New York State Mus., 45, 1901, p. 164, fig. 61.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 28, 29, pl. 13, figs. 1-5; pl. 24, figs. 10, 11; pl. 25, figs. 11, 12.—*Grabau and Shimer, N. A. Index Foss., 1, 1907, p. 133.

Clinton: Lockport, Rochester, Middleport, etc., New York; Grimsby, Hamilton, and Thorold, Ontario (Rochester); Osgood, Indiana (Osgood).

Niagaran (Waldron): Waldron, Indiana.

Plesiotypes.—Cat. No. 35517, U.S.N.M.

Observation.—The citations preceded by the (*) refer to the Waldron form, which may be specifically distinct.

BATOSTOMELLA GRANULIFERA Ulrich. See *Homotrypella granulifera*.

Batostomella interporosa Ulrich and Bassler.

Batostomella interporosa Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 270, pl. 45, figs. 1, 2; pl. 48, fig. 5.

Helderbergian (Keyser): Devils Backbone, near Cumberland, Maryland.

Cotypes.—Cat. No. 53761, U.S.N.M.

BATOSTOMELLA SIMULATRIX Ulrich. See *Eridotrypa simulatrix*.

BATTUS PISIFORMIS Dalman. See *Agnostus pisiformis*.

BATTUS FUSILLUS Sars. See *Shumardia pusilla*.

BATTUS TUBERCULATUS Kloeden. See *Beyrichia tuberculata*.

BEATRICEA Billings.

Genotype: *B. nodulosa* Billings.

Beatricea Billings, Geol. Surv. Canada, Rep. Progr. for 1853-6, 1857, p. 343; Canadian Jour., n. s., 3, 1858, p. 331; Canadian Nat. Geol., n. s., 2, 1865, p. 405.—Hyatt, Amer. Jour. Sci. Arts, 2d. ser., 39, 1865, p. 261-266.—Linney, Geol. Surv. Kentucky, Notes on Rocks Central Kentucky, 1883, p. 14.—Nicholson, Mon. British Strom., Pal. Soc., 1886, pp. 9, 86.—James, Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 245.—Miller, N. A. Geol. Pal., 1889, p. 155.—Grant, Jour. and Proc. Hamilton Assoc., 6, 1890, p. 122.—James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 3, 1892, p. 94.—Grabau and Shimer, N. A. Index Foss., 1, 1906, p. 46.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 699.—Parks, Univ. Toronto Studies, Geol. Ser., No. 7, 1910, p. 37.

Beatricea nodulifera Foerste.

Beatricea nodulifera Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 299, pl. 7, fig. 13; pl. 8, fig. 5.—Parks, Univ. Toronto Studies, Geol. Ser., No. 7, 1910, p. 47, pl. 25, fig. 10.

Richmond (Liberty): Near Sulphur Spring, three miles southeast of Lebanon, and Bardstown, Kentucky.

Beatricea nodulifera intermedia Foerste.

Beatricea nodulifera intermedia Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 300, pl. 8, figs. 4a-c.—Parks, Univ. Toronto Studies, Geol. Ser., No. 7, 1910, p. 47, pl. 25, fig. 9.

Richmond (Liberty): Marion County, Kentucky.

***Beatricea nodulosa* Billings.**

Beatricea nodulosa Billings, Geol. Surv. Canada, Rep. Progr. for 1853-6, 1857, p. 344; Canadian Jour., n. s., 3, 1858, p. 332.—Hyatt, Proc. Boston Soc. Nat. Hist., 10, 1865, p. 19; Amer. Jour. Sci. and Arts, 2d ser., 39, 1865, pp. 262, 266.—Billings, Cat. Sil. Foss., Anticosti, Geol. Surv. Canada, 1866, p. 8 (loc. ref.)—Shaler, Amer. Nat., 11, 1877, p. 628.—Nicholson, Mon. British Strom., pt. 1, Pal. Soc., 1886, p. 87-89; pl. 8, figs. 1-8.—James, Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 245; 15, pt. 3, 1892, p. 95.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 114 (loc. occ.); Canadian Rec. Sci., 7, 1897, p. 132.—Grabau and Shimer, N. A. Index Foss., 1, 1906, p. 47, fig. 74.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 700, pl. 1, figs. 1a-b.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 300.—Parks, Univ. Toronto Studies, Geol. Ser., No. 7, 1910, p. 45, pl. 25, figs. 2-5, 7-8.

Richmond: Wreck Point, Salmon River, etc., Anticosti; Stony Mountain, Manitoba; Ohio; Indiana; Kentucky.

BEATRICEA SULCATA Hyatt. See *Beatricea undulata*.

***Beatricea undulata* Billings.**

Beatricea undulata Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 344; Canadian Jour., n. s., 3, 1858, p. 332; Canadian Nat. Geol., n. s., 2, 1865, p. 405, figs. 1, 2.—Hyatt, Amer. Jour. Sci. and Arts, 2d ser., 39, 1865, pp. 261, 266.—Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 8, 34 (loc. ref.)—Shaler, Amer. Nat., 11, 1877, p. 628.—Nicholson, Mon. Brit. Strom., Pal. Soc., 1886, p. 89.—James, Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 245; 15, pt. 3, 1892, p. 95.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 114 (loc. occ.); Canadian Rec. Sci., 7, 1897, p. 133.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 47.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 701, pl. 1, fig. 1.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 298, pl. 8, fig. 3.—Parks, Univ. Toronto Studies, Geol. Ser., No. 7, 1910, p. 43, pl. 25, figs. 1, 6, 7.

Beatricea sulcata Hyatt, Proc. Boston Soc. Nat. Hist., 10, 1865, p. 19 (error for *undulata*).

Richmond: Cape James, Table Head, etc., Anticosti; Snake Island, Lake St. John, Quebec; Rabbit and Club Islands, Lake Huron; Stony Mountain, Manitoba; Marion, Nelson, Madison, and Bullitt Counties, Kentucky; Ohio and Indiana.

***Beatricea undulata cylindrica* Foerste.**

Beatricea undulata-cylindrica Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 298, pl. 9, fig. 7.—Parks, Univ. Toronto Studies, Geol. Ser., No. 7, 1910, p. 44.

Richmond: Four miles north Richmond, and Marion and Nelson counties, Kentucky (Liberty); Elkhorn Creek, south of Richmond, Indiana (Elkhorn).

BELEMNOCYSTIS Bather. See *Belemnocystites* Miller and Gurley.

BELEMNOCYSTITES Miller and Gurley.

Genotype: *B. wetherbyi* Miller and Gurley.

Belemnocystites Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 8.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 739.

Belemnocystis Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 51.

Belemnocystites wetherbyi Miller and Gurley.

Belemnocystites wetherbyi Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 9, pl. 1, figs. 4-6.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 740, fig. 1321.

Trenton (Curdsville): Mercer County, Kentucky.

BELLEROPHON (part) of authors. See *Sinuities* Koken, *Salpingostoma* Roemer, *Bucanopsis* Ulrich, *Tetranota* Ulrich and Scofield, and *Oxydiscus* Koken.

BELLEROPHON Montfort.

Genotype: *B. vasulites* Montfort.

Bellerophon Montfort, *Conchiliologie Systematique*, 1, 1808, p. 51.—Pictet, *Traité de Pal.*, 2d ed., 3, 1855, p. 286.—Emmons, *Amer. Geology*, pt. 2, 1855, pp. 163, 164.—Miller, *Cincinnati Quart. Jour. Sci.*, 1, 1874, p. 306.—Waagen, *Mem. Geol. Surv. India*, Pal. Indica, 13th ser., 1, 1880, pp. 130, 133.—Zittel, *Handb. Pal.*, 2, 1882, p. 183.—Walcott, *Mon. U. S. Geol. Surv.*, 8, 1884, p. 192.—Nettelroth, *Kentucky Foss. Shells*, Geol. Surv. Kentucky, 1889, p. 158.—Koken, *Neues Jahrb. f. Min., Geol., Pal.*, Beilage-Band, 6, 1889, p. 385.—Miller, N. A. Geol. Pal., 1889, p. 396.—Grabau, *Bull. Buffalo Soc. Nat. Sci.*, 6, 1899, p. 280.—Girty, 19th Ann. Rep. U. S. Geol. Surv., 1899, p. 592.—Koken, *Die Leitfossilien*, 1896, pp. 100, 101, fig. 78, 2.—Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, pp. 853-914.—Pilsbry, *Zittel-Eastman Textb. Pal.*, 1, 1900, p. 445.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 948.—Grabau and Shimer, N. A. Index Fossils, 3, 1909, p. 618.—Dall, *Zittel-Eastman Textb. Pal.*, 2ed ed., 1913, p. 522.

BELLEROPHON ACUTUS Sowerby. See *Oxydiscus acutus*.

Bellerophon allegoricus White.

Bellerophon allegoricus White, *Geogr. Geol. Expl. West 100th Merid.*, Prel. Rep., 1874, p. 10; *Rep. U. S. Geogr. Surv. West 100th Merid.*, 4, 1877, p. 55, pl. 3, fig. 6a-c.

Middle Ordovician: Fish Spring, House Range, Utah.

Cotypes.—Cat. No. 8564, U.S.N.M.

BELLEROPHON ANGUSTATA Billings. See *Tremanotus angustata*.

BELLEROPHON ANTIQUATUS Whitfield. See *Owenella antiquata*.

BELLEROPHON ARGO Billings. See *Oxydiscus argo*.

Bellerophon auriculatus Hall.

Bellerophon auriculatus Hall, *Pal. New York*, 2, 1852, p. 334, pl. 76, fig. 7a, b.—Emmons, *Man. Geol.*, 1860, p. 108, fig. 98.

Cayuga (Cobleskill): Schoharie, New York.

BELLEROPHON BIDORSATUS of authors. See *Tetranota bidorsata*.

Bellerophon bilineatus Ulrich.

Bellerophon bilineatus Ulrich, *Geol. Minnesota*, 3, pt. 2, 1897, p. 917, pl. 64, figs. 19-21.

Trenton (Flanagan): Near Danville, Kentucky.

Holotype.—Cat. No. 45697, U.S.N.M.

BELLEROPHON BILOBATUS Emmons. See *Sinuities cancellatus*.

BELLEROPHON BILOBATUS var. *ACUTUS* Hall. See *Sinuities cancellatus acutus*.

BELLEROPHON BILOBATUS var. *CORRUGATUS* Hall. See *Sinuities cancellatus corrugatus*.

Bellerophon bretonensis Matthew.

Bellerophon Bretonensis Matthew, Bull. Nat. Hist. Soc. New Brunswick, 20, 1902, p. 409, pl. 18, figs. 4a-d; Geol. Surv. Canada Rep. Cambrian Rocks, Cape Breton, 1903, p. 218, pl. 18, figs. 4a-d.

Canadian (Bretonian-Div. C 3c.): McLeod Brook, near Boisdale, Cape Breton, Nova Scotia.

Bellerophon calcifer Cleland.

Bellerophon calcifer Cleland, Bull. Amer. Pal., 3, 1900, p. 126 (254), pl. 15, figs. 15-18; 4, 1903, p. 18.

Canadian (Tribes Hill): Fort Hunter and Canajoharie, New York.

BELLEROPHON CANADENSIS Billings. See *Salpingostoma canadensis*.

BELLEROPHON CANCELLATUS Hall. See *Sinuities cancellatus*.

Bellerophon capax Ulrich.

Bellerophon capax Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 921, pl. 63, figs. 50, 51; pl. 64, figs. 40-43.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

Cotypes.—Cat. Nos. 45698, 45699, U.S.N.M.

BELLEROPHON CASSINENSIS Whitfield. See *Sinuities cassinensis*.

Bellerophon charon Billings.

Bellerophon Charon Billings, Canadian Nat. Geol., 5, 1860, p. 169, figs. 14, 15; Geol. Canada, Geol. Surv. Canada, 1863, p. 146, fig. 97a, b.

Black River (Leray): Pauquettes Rapids, Ottawa River, Canada.

Bellerophon cincinnatiensis Miller and Faber.

Bellerophon cincinnatiensis Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 29, pl. 1, figs. 23, 24.

Maysville: Cincinnati, Ohio.

Bellerophon clausus Ulrich.

Bellerophon clausus Ulrich Geol. Minnesota, 3, pt. 2, 1897, p. 916, pl. 64, figs. 7-10.—Hayes and Ulrich, U. S. Geol. Surv., Folio 95, 1903, illust. sheet, fig. 32-34.

Trenton: Frankfort, Kentucky (Perryville), and near Nashville, Tennessee (Catheys).

Cotypes.—Cat. Nos. 45700, 45701, U.S.N.M.

Bellerophon consimilis Savage.

Bellerophon consimilis Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 98, pl. 6, fig. 2.

Upper Medinan (Edgewood): Alexander County, Illinois; Missouri.

Bellerophon convolutus Eaton.

Not recognized.

Bellerophon convolutus Eaton, Geol. Textb., 2d ed., 1832, p. 28.

Silurian(?): Helderberg, New York.

Bellerophon declivis Conrad.

Bellerophon declivis Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 269, pl. 17, fig. 3.

Trenton: Near Carlisle, Pennsylvania.

Bellerophon dilatatus (Sowerby?) Billings.

Bellerophon dilatatus (Sowerby?) Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 56 (loc. ref.).

Anticostian (Gun River and Jupiter River): The Jumpers, Anticosti.

BELLEROPHON DISCULUS Billings. See *Oxydiscus disculus*.

BELLEROPHON (BUCANIA) EXIGUA Foerste. See *Bucania exigua*.

BELLEROPHON EXPANSUS Emmons. See *Salpingostoma expansa*.

BELLEROPHON FISCELLO-STRIATUS Foerste. See *Bucania fiscello-striata*.

BELLEROPHON FRATERNUS Billings. See *Salpingostoma fraternum*.

BELLEROPHON GLOBULARIS Miller and Faber. See *Sinuities globularis*.

Bellerophon gorbyi Miller.

Bellerophon gorbyi Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1892, p. 694, pl. 14, figs. 7-9.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 953, pl. 39, figs. 1-1b.

Maysville: Dearborn County, Indiana.

Bellerophon helderbergiae Maynard.

Bellerophon helderbergiae Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 466, pl. 79, figs. 3, 4.

Helderbergian (Keyser): Cash Valley, Maryland.

Bellerophon insulæ Matthew.

Bellerophon insulæ Matthew, Bull. Nat. Hist. Soc. New Brunswick, 20, 1902, p. 408, pl. 18, fig. 3; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 217, pl. 18, fig. 3.

Canadian (Bretonian—Div. C3c2): McLeod Brook, near Boisdale, Cape Breton, Nova Scotia.

BELLEROPHON INTEXTUS Emmons. See *Bucania intexta*.

BELLEROPHON LINDSLEYI Safford. See *Bucania lindsleyi*.

Bellerophon lirata Hall.

Bellerophon (Bucania) lirata Hall, Geol. Rep. Wisconsin, 1862, p. 55, figs. 7, 8. Richmond (Maquoketa): Southwestern Wisconsin.

BELLEROPHON MACER Billings. See *Oxydiscus macer*.

Bellerophon miser Billings.

Bellerophon miser Billings, Cat. Sil. Fossils Anticosti, Geol. Surv. Canada, 1896, p. 20.

Richmond (English Head): Macasty Bay, Anticosti.

Bellerophon mohri Miller.

Bellerophon Mohri Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 306, fig. 30; N. A. Geol. Pal., 1889, p. 397, fig. 653.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 920, pl. 64, figs. 44-45.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 954, pl. 39, figs. 2-2a.

Richmond (Whitewater): Richmond, Indiana; Lincoln County, Kentucky. *Plesiotypes*.—Cat. No. 45702, U.S.N.M.

BELLEROPHON MORROWENSIS Miller and Dyer. See *Sinuities morrowensis*.

Bellerophon nashvillensis Troost.

Bellerophon Nashvillensis Troost, 5th Geol. Rep. Tennessee, 1840, p. 54; 6th Rep., 1841, p. 175 (nom. nud.); 7th Rep., 1844, p. 17.

Ordovician: Davidson County, Tennessee.

Observation.—Not defined. Probably refers to the abundant *Bellerophon troosti* D'Orbigny.

Bellerophon nautarum Salter.

Bellerophon Nautarum Salter, Sutherland's Jour. Voyage in Baffins Bay, etc., 2, App., 1852, p. ccxxiii, pl. 5, fig. 20.

Niagaran: Dundas Island, Victoria Channel, Arctic America.

BELLEROPHON (BUCANIA) OPERTUS Foerste. See *Bucania operta*.

BELLEROPHON PALINURUS Billings. See *Oxydiscus palinurus*.

Bellerophon patersoni Hall.

Bellerophon patersoni Hall, Geol. Rep. Wisconsin, 1862, p. 55, fig. 9.

Richmond (Maquoketa): Southwestern Wisconsin.

BELLEROPHON (BUCANIA) PERFORATUS Winchell and Marcy. See *Tremanotus alpheus*.

Bellerophon platystoma (Meek and Worthen).

Bellerophon (Bucania?) *platystoma* Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 312, pl. 3, figs. 8a, b.

Bellerophon platystoma Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 918, pl. 64, figs. 22-30.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 619, figs. 829d-g.

Trenton: Galena and Dixon, Illinois (Galena); Kenyon, Wykoff, etc., Minnesota (Prosser).

Plesiotypes.—Cat. Nos. 45703, 45704, U.S.N.M.

Bellerophon profundus Emmons.

Bellerophon profundus Emmons, Nat. Hist. New York Geol., 2, 1842, p. 393, fig. 103; Amer. Geology, 1, pt. 2, 1855, p. 233, pl. 17, fig. 7.—Lesley, Geol. Surv.

Pennsylvania, Rep. P 4, 1889, p. 86, figs.

Trenton: Watertown, New York.

BELLEROPHON PUNCTIFRONS Emmons. See *Bucania punctifrons*.

Bellerophon recurvus Ulrich.

Bellerophon recurvus Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 920, pl. 64, figs. 11-13.

Maysville (Corryville): Cincinnati, Ohio.

Cotypes.—Cat. No. 45705, U.S.N.M.

Bellerophon rogersensis Foerste.

Bellerophon rogersensis Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 141, pl. 2, figs. 4a-c.

Trenton (Upper): Near Rogers Gap, Kentucky.

BELLEROPHON ROTUNDATUS Emmons. See *Bucania sulcatina*.

Bellerophon rugosus Emmons.

Bellerophon rugosus Emmons, Amer. Geology, 1, pt. 2, 1855, p. 166, fig. 37; Man. Geol., 1860, p. 103, fig. 93.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 853 (gen. ref.).

Bucania rugosa Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 97, fig.

Cincinnati (Pulaski): Lorraine, Jefferson County, New York.

Bellerophon semisculptus Matthew.

Bellerophon semisculptus Matthew, Bull. Nat. Hist. Soc. New Brunswick, 20, 1902, p. 410, pl. 18, fig. 5; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 219, pl. 18, fig. 5.

Canadian (Bretonian—Div. C3c2): McLeod Brook, near Boisdale, Cape Breton, Nova Scotia.

Bellerophon shelbiensis Clarke and Ruedemann.

Bucania stigmosea Whiteaves (not Hall), Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 34, pl. 5, fig. 3; pl. 8, fig. 4.

Bellerophon shelbiensis Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 51, pl. 5, figs. 13-19.

Niagaran (Guelph-Shelby): Shelby, New York.

Bellerophon similis Ulrich and Scofield.

Bellerophon similis Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 919, pl. 64, figs. 31-39.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 165.

Trenton: Wykoff, Kenyon, etc., Minnesota (Prosser); Head of Frohisher Bay, Baffin Land.

Cotypes.—Cat. Nos. 45706, 45707, U.S.N.M.

Bellerophon solitarius Billings.

Bellerophon solitarius Billings, Cat. Sil. Fossils, Anticosti, Geol. Surv. Canada, 1866, p. 20.

Richmond (English Head): McCasty Bay, Anticosti.

Bellerophon subangularis Ulrich.

Bellerophon subangularis Ulrich, Geol. Minnesota, 3, 1897, p. 920, pl. 64, figs. 14-16.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 954, pl. 39, figs. 3-3b.

Richmond (Whitewater): Richmond, Indiana.

Holotype.—Cat. No. 45708, U.S.N.M.

Bellerophon subglobulus Ulrich.

Bellerophon subglobulus Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 917, pl. 64, figs. 17 and 18.

Black River (Lowville): Mercer County, Kentucky.

Holotype.—Cat. No. 45709, U.S.N.M.

Bellerophon subovatus Cleland.

Bellerophon subovatus Cleland, Bull. Amer. Pal., 3, 1909, p. 217 (255), pl. 15, figs. 19-21.

Canadian (Tribes Hill): Near Fort Hunter, New York.

BELLEROPHON SULCATINUS of authors. See *Bucania sulcatina*.

BELLEROPHON TRILOBATUS Hall. See *Bucanella trilobata*.

Bellerophon troosti D'Orbigny.

Bellerophon troosti D'Orbigny, Cephalopoda, 1840, p. 206.—Safford, Geol. Tennessee, 1869, p. 289, pl. 3G, figs. 4a-4d.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 915, pl. 64, figs. 1-5.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 618, fig. 829a-c.—Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, p. 183, fig. 20, 9, 10.

Trenton: Nashville, Hartsville, etc., Tennessee (Catheys) Danville; Frankfort, etc., Kentucky (Flanagan); Virginia.

Plesiotypes.—Cat. Nos. 45710, 45711, U.S.N.M.

Bellerophon troosti burginensis Ulrich.

Bellerophon troosti var. *burginensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 916, pl. 64, fig. 6.

Trenton (Flanagan): Near Burgin and Danville, Kentucky.

Holotype.—Cat. No. 45712, U.S.N.M.

Bellerophon tuber Hall.

Bellerophon tuber, Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, pl. 30, figs. 19, 20; mus. ed., 1879, p. 177, pl. 30, figs. 19, 20; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 320, pl. 31, figs. 19, 20; pl. 33, fig. 6.

Niagaran (Waldron): Waldron, Indiana.

Bellerophon volutus Eaton.

Not recognized.

Bellerophon volutus Eaton, Geol. Textb., 1832, p. 28.

Silurian: Helderberg region of New York.

BELLEROPHON WISCONSINENSIS Whitfield. See *Tetranota wisconsinensis*.

BERENICEA Lamouroux.

Genotype: *Berenicea diluviana* Lamouroux.

Berenicea Lamouroux (part), Expos. Meth. des Genres d. Pol., 1821, p. 80.—McCoy, Brit. Pal. Foss., 52, p. 44.—D'Orbigny, Pal. Franc. Terr. Cret., 5, 1854, p. 858.—Haime, Bry. de la Form. Juras., 1854, p. 175.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 149.—Miller, N. A. Geol. Pal., 1889, p. 294.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 368; Geol. Minnesota, 3, 1893, p. 120.—Zittel's Textb. Pal. (Engl. ed.), 1896, p. 261.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 594.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 20.—Bassler, Bull. U. S. Geol. Surv. 292, 1906, p. 16.—Hennig, Archiv. fur Zool., K. Sven. Vet.-Akad. Stockholm, 3, No. 10, 1906, p. 25.—Grabau and Shimer, N. A. Index Fossils, I, 1907, p. 119.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 741.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 319.

Rosacilla Roemer, Verst. des Norddeutsh. Kreidegeb., 1840, p. 19.

Diastopora (not Lamouroux) D'Orbigny, Busk and other English authors.

Diastoporella Vine, Rep. Brit. Assoc. Adv. Sci., 52, 1883, p. 275; Rep. 53d Meeting Brit. Assoc. Adv. Sci., 1884, p. 187; Proc. Yorkshire Geol. Polytech. Soc., 9, 1887, p. 190.

Sagenella Hall, Amer. Jour. Sci. and Arts, 2d ser., 11, 1851, p. 401; Pal. New York, 2, 1852, p. 172.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 171.—Miller, N. A. Geol. Pal., 1889, p. 321.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 8.—Simpson, 14th Ann. Rep. State Geol. New York, 1897, p. 597.

Berenicea consimilis (Lonsdale).

Aulopora consimilis Lonsdale, in Murchison's Sil. Syst., pt. 2, 1839, p. 675, pl. 15.

——— Hall, Pal. New York, 2, 1852, p. 173, pl. 40E, figs. 8a, b.

Diastopora consimilis Vine, Quart. Jour. Geol. Soc. London, 38, 1882, p. 58.

Diastoporella consimilis Vine, Rep. 53d meeting British Assoc. Adv. Sci., 4, 1883; Proc. Yorkshire Geol. and Polytech. Soc., 9, 1887, p. 190, pl. 12, figs. 18–20.

Berenicea consimilis Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 16, 17, pl. 5, figs. 1–5.

Sagenella membranacea Hall, Pal. New York, 2, 1852, p. 172, pl. 40E, figs. 6a, b.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 181.

Sagenella elegans Hall, 28th Rep. New York State Mus., doc. ed., 1876, pl. 7, figs. 12, 13; Mus. ed., 1879, p. 118, pl. 7, figs. 12, 13; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 242, pl. 6, figs. 12, 13.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 917, figs.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, pl. 20, fig. 4.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 181.

Silurian: Dudley and Shropshire, England (Wenlock); Island of Gotland; western New York and Ontario (Rochester); Osgood, Indiana (Osgood); Waldron, Indiana; and Newsom, Tennessee (Waldron).

Pteriotypes.—Cat. Nos. 35565, 44115, U.S.N.M.

BERENICEA ELEGANS Nickles and Bassler. See *Berenicea consimilis*.

BERENICEA MEMBRANACEA Nickles and Bassler. See *Berenicea consimilis*.

***Berenicea minnesotensis* Ulrich.**

Berenicea minnesotensis Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 58; Geol. Minnesota, 3, 1893, p. 120, pl. 1, figs. 25, 27, 29, pl. 2, fig. 1.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 595, figs. 197, 198.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 119, fig. 178e. *Proboscina minnesotensis* Sardeson, Jour. Geol., 9, 1901, p. 169, fig. 2B. Black River (Decorah): Minneapolis, Minnesota, and vicinity. *Cotypes*.—Cat. No. 43269, U.S.N.M.

***Berenicea primitiva* Ulrich.**

Berenicea primitiva Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 157, pl. 6, fig. 4.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 779, pl. 26, fig. 12. Maysville and Richmond: Cincinnati, Waynesville, Lebanon, Clarksville, etc., Ohio; Richmond and Versailles, Indiana. *Holotype*.—Cat. No. 43268, U.S.N.M.

***Berenicea vesiculosa* Ulrich.**

Berenicea vesiculosa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 158, pl. 6, fig. 5. Eden: Cincinnati, Ohio, and vicinity. *Holotype*.—Cat. No. 43267, U.S.N.M.

BEYRICHIA McCoy.

Genotype: *B. kloedeni* McCoy.

Beyrichia McCoy (part), Synop. Sil. Foss. Ireland, 1846, p. 57.—Bell and Forbes, in Burmeister's Org. Tril., London, Suppl. App., 1846, p. 124.—McCoy, Brit. Pal. Rocks and Foss., 1854, p. 135.—Jones, Ann. Mag. Nat. Hist., 2d ser., 16, 1855, p. 85.—Hall, Pal. New York, 3, 1859, p. 377.—Barrande, Syst. Sil. du Centre Bohme, 1, Suppl., 1872, p. 490.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 118.—Zittel, Handb. Pal., 2, 1885, p. 553.—Reuter, Zeits. d. d. Geol. Gesell., 37, 1885, p. 628.—Jones and Holl, Ann. Mag. Nat. Hist., 5th ser., 17, pp. 338, 345.—Jones and Kirkby, Proc. Geol. Assoc. (London), 9, 1886, p. 505.—Verworn, Zeits. d. d. Geol. Gesell., 39, 1887, p. 27.—Kraus, ibid., 41, 1889, p. 17.—Miller, N. A. Geol. Pal., 1889, p. 534.—Vogdes, Annals New York Acad. Sci., 5, 1889, p. 8, pl. 2, figs. 19–21.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 657.—Koken, Die Leitfossilien, Leipzig, 1896, p. 40, text fig. 26B, p. 431.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 306.—Ulrich, Zittel-Eastman Textb. Pal., 1, 1900, p. 644.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 151; 35, 1908, pp. 283, 284.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 355.—Bassler, Zittel-Eastman Textb., Pal., 2d ed., 1913, p. 738.

Observation.—Most of the earlier references in the above bibliography are not to *Beyrichia* as now restricted.

***Beyrichia atlantica* Billings.**

Beyrichia Atlantica Billings, Geol. Surv. Canada, Pal. Foss., 1, 1865, p. 300. Chazyan (Quebec—L, M): Point Rich and Table Head, Newfoundland.

BEYRICHIA BARRETTI Weller. See *Kloedenia barretti*.

***Beyrichia bella* Walcott.**

Beyrichia bella Walcott, Desc. new Spec. Trenton Group, 1883, p. 7, pl. 17, fig. 11; 35th Rep. New York State Mus. Nat. Hist., 1884, p. 213, pl. 17, figs. 11, 11a.

Trenton: Trenton Falls, New York.

BEYRICHIA BICORNIS Miller. See *Dicranella bicornis*.

BEYRICHIA BUCHIANA Jones. See *Bollia persulcata*.

BEYRICHIA CHAMBERSI Miller. See *Ceratopsis chambersi*.

BEYRICHIA CHAMBERSI VAR. ROBUSTA Ulrich. See *Ceratopsis robusta*.

BEYRICHIA CILIATA Emmons. See *Ctenobolbina ciliata*.

BEYRICHIA CINCINNATIENSIS Miller. See *Primitia cincinnatiensis*.

BEYRICHIA CLARKEI Jones. See *Klœdenella clarkiei*.

Beyrichia clathrata Jones.

Beyrichia clathrata Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 242, pl. 9, fig. 1.

Niagaran: Beechey Island, Arctic America.

BEYRICHIA CLAVIGERA Jones. See *Isochilina? clavigera*.

BEYRICHIA CLAVIGERA CLAVIFRACTA Jones. See *Isochilina? clavigera clavifracta*.

BEYRICHIA DECKERENSIS Weller. See *Klœdenia manliensis deckerensis*.

BEYRICHIA DECORA Billings. See *Beyrichia venusta*.

Beyrichia diffusa Jones.

Beyrichia diffusa Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 546, pl. 21, fig. 7.

Anticostian (Jupiter River): Jupiter River, Anticosti.

BEYRICHIA DURYI Miller. See *Ctenobolbina duryi*.

Beyrichia equilatera Hall.

Beyrichia equilatera Hall, Canadian Nat. Geol., 5, 1860, p. 158, fig. 20.—Dawson, Acadian Geol., 2d ed., 1868, p. 609, fig. 217.—Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 18, pl. 2, fig. 6; p. 552; Geol. Surv. Canada, Contr. Micro-Pal., pt. 3, 1891, p. 72, pl. 11, fig. 6.

Silurian: Arisaig, Nova Scotia.

Beyrichia forbesi Jones.

Beyrichia Forbesii Jones, Quart. Jour. Geol. Soc. London, 17, 1861, p. 67, pl. 4, figs. 13a-c.

Silurian: Mount Illampu, Bolivia.

Beyrichia granulosa Hall.

Beyrichia granulosa Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 32, fig. 4; mus. ed., 1879, p. 186, pl. 32, fig. 4; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 331, pl. 34, fig. 4.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 37, fig. 15.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 355, fig. 1663a.

Niagaran (Waldron): Waldron, Indiana.

BEYRICHIA HALLI Jones. See *Klœdenella halli*.

BEYRICHIA HAMMELLI Miller and Faber. See *Ctenobolbina hammelli*.

BEYRICHIA INITIALIS Ulrich. See *Klœdenia initialis*.

BEYRICHIA JERSEYENSIS Weller. See *Klœdenia jerseyensis*.

BEYRICHIA KÜMMELI Weller. See *Klœdenia kümmeli*.

Beyrichia lata (Vanuxem).

Agnostus latus Vanuxem, Geol. New York, 3d Geol. Dist., 1842, p. 80.

Beyrichia lata Hall (part), Pal. New York, 2, 1852, p. 301, pl. A 66, figs. 10c-e. (Not b=*Bollia lata*.)—Jones, Ann. Mag. Nat. Hist., 2d ser., 16, 1855, p. 168, pl. 6, fig. 13.—Leeley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 90, figs.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 292, fig. 25.

Clinton: New York, Pennsylvania, Maryland, etc.

Pteriotype.—Cat. No. 41557, U.S.N.M.

Beyrichia lata triplicata Foerste.

Beyrichia lata-triplicata Foerste, Bull. Geol. Surv. Kentucky, 7, 1906, p. 329; Jour. Cincinnati Soc. Nat. Hist., 21, 1909, pl. 1, fig. 4.

Clinton (Alger): Lewis County, Kentucky.

BEYRICHIA LOGANI Jones. See *Primitia logani*.

BEYRICHIA LOGANI var. *LEPERDITOIDES* Jones. See *Primitia logani leperditoides*.

BEYRICHIA LOGANI var. *RENIFORMIS* Jones. See *Primitia logani reniformis*.

BEYRICHIA MANLIENSIS Miller. See *Klœdenia manliensis*.

BEYRICHIA MARGINATA Miller. See *Dicranella marginata*.

BEYRICHIA MONTAGUENSIS Weller. See *Klœdenia montaguensis*.

Beyrichia moodeyi Ulrich and Bassler.

Beyrichia moodeyi Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 285, pl. 37, fig. 8.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 355, fig. 1663d.

Cayugan (Mackenzie): Near Cacapon, West Virginia.

Cotypes.—Cat. No. 53936, U.S.N.M.

BEYRICHIA NEARPASSI Weller. See *Klœdenia nearpassi*.

BEYRICHIA NOETLINGI Reuter. See *Beyrichia tuberculata noetlingi*.

BEYRICHIA NOTATA Hall. See *Klœdenia notata*.

BEYRICHIA NOTATA var. *VENTRICOSA* Hall. See *Klœdenia notata ventricosa*.

BEYRICHIA OCUlifera Miller. See *Ceratopsis oculifera*.

Beyrichia parallela (Ulrich).

Primitia? (?*Beyrichia*) *parallela* Ulrich, Geol. Surv. Canada, Contr. Micro-Pal., pt. 2, 1889, p. 51, pl. 9, figs. 7, 7a.

Beyrichia (?*Primitia*) *parallela* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 125, pl. 10, fig. 15a-c.

Beyrichia parallela Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 319, fig. 64.

Richmond: Stony Mountain, Manitoba (Stony Mountain); Richmond, Indiana; Oxford, Ohio (Whitewater); Anticosti (Charleton).

Pteriotype.—Cat. No. 41434, U.S.N.M.

BEYRICHIA PERINFLATA Weller. See *Klœdenia sussexensis*.

BEYRICHIA PERSULCATA Ulrich. See *Bollia persulcata*.

Beyrichia plagosa Jones.

Beyrichia plagosa Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 243, pl. 9, fig. 2. Niagara: Beechey Island, Arctic America.

***Beyrichia pustulosa* Hall.**

Beyrichia pustulosa Hall, Canadian Nat. Geol., 5, 1860, p. 157, fig. 19.—Dawson, Acadian Geol., 2d ed., 1868, p. 608, fig. 216.

Beyrichia tuberculata var. *pustulosa* Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 18, pl. 2, fig. 1a-c; Geol. Surv. Canada, Contr. Micro-Pal., pt. 3, 1891, p. 76, pl. 11, fig. 2.

Silurian: Arisaig, Nova Scotia.

BEYRICHIA QUADRIFIDA Jones. See *Ceratopsis*? *quadrifida*.

BEYRICHIA QUADRILIRATA Hall and Whitfield. See *Tetradella quadrilirata*.

BEYRICHIA REGULARIS Emmons. See *Bollia regularis*.

BEYRICHIA REGULARIS Miller. See *Tetradella quadrilirata*.

BEYRICHIA RICHARDSONI Miller. See *Drepanella richardsoni*.

BEYRICHIA RUGULIFERA Jones. See *Primitia rugulifera*.

BEYRICHIA SIGILLATA Jones. See *Primitia sigillata*.

BEYRICHIA SIMPLEX Miller. See *Dicranella*? *simplex*.

Beyrichia simplex Emmons. Not recognized.

Beyrichia simplex Emmons (not Jones, 1853), Amer. Geology, 1, pt. 2, 1855, p. 218, fig. 74a.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 91, fig.

Blue limestone: Ohio.

BEYRICHIA SMOCKI Weller. See *Kloedenia smocki*.

BEYRICHIA SPINOSA Hall. See *Echmina spinosa*.

BEYRICHIA SPINOSA Miller. See *Dicranella spinosa*.

BEYRICHIA STRIATO-MARGINATUS Miller. See *Eurychilina*? *striatmarginata*.

BEYRICHIA SUSSEXENSIS Weller. See *Kloedenia sussexensis*.

BEYRICHIA SYMMETRICA Hall. See *Kloedenella symmetrica*.

BEYRICHIA SYMMETRICA Emerson. See *Drepanella symmetrica*.

BEYRICHIA TRISULCATA Hall. See *Kloedenella trisulcata*.

***Beyrichia tuberculata* (Kloeden).**

Battus tuberculatus Kloeden (part), Verstein. der Mark Brandenburg, 1834, p. 115-117, pl. 1, figs. 21-23.

Agnostus tuberculatus Quenstedt, Petrefactenkunde, 1852, p. 302, pl. 23, figs. 25-28.

Beyrichia tuberculata Boll, Palaeontographica, 1, 1847, p. 127; Archiv des Vereins der Freunde der Naturgeschichte in Meklenburg, 16 Jahr., 1862, p. 119, pl. 1, figs. 1a, b.—Bronn and Roemer, Lethæa geog., 1, 1854, p. 536, pl. 10, figs. 9a-d.—Jones, Ann. Mag. Nat. Hist., 2d ser., 16, 1855, p. 86, pl. 5, figs. 4-9b; Proc. Geol. Soc., Pal. Div. Entom., 1869, p. 12, figs. 12a-c; Geol. Mag., dec. 2, 3, 1881, p. 344, pl. 10, figs. 8-10; Ann. Mag. Nat. Hist., 6th ser., 1, 1888, p. 402, pl. 21, fig. 12.—Roemer, Lethæa palæozoica, 1876, pl. 19, figs. 9a-d.—Krause, Zeitschr. d. d. geol. Gesell., 29, 1877, p. 30, pl. 1, figs. 12a, b.—Hoernes, Palaeontologie, 1884, p. 379, figs. 525c, d.—Reuter, Zeits. d. d. geol. Ges., 37, 1885, p. 632, pl. 25, figs. 1a, b.—Zittel, Handb. Pal., 2, 1885, p. 553, figs. 739, 740.—Verworn, Zeitschr. d. d. geol. Gesell., 1887, p. 31, pl. 3, fig. 12.—Jones, Contr. Micro-Pal., Geol. Surv. Canada, 3, 1891, p. 74, pl. 2, fig. 3.

Silurian: Europe; Stonehouse Brook, Arisaig, Nova Scotia.

***Beyrichia tuberculata noetlingi* (Reuter).**

Beyrichia Noetlingi Reuter, Zeits. d. d. geol. Gesell., 37, 1885, p. 637, pl. 25, figs. 5a, 5b.

Beyrichia tuberculata var. *noetlingi* Jones, Contr. Micro. Pal. Geol. Surv. Canada, 3, 1891, p. 78, pl. 11, figs. 4a, b, 5.

Silurian: Europe; Stonehouse Brook, Arisaig, Nova Scotia.

BEYRICHIA TUBERCULATA var. **PUSTULOSA** Jones. See *Beyrichia pustulosa*.

***Beyrichia tuberculata strictispiralis* Jones.**

Beyrichia tuberculata var. *strictispiralis* Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 77, pl. 11, fig. 1.

Silurian: Arisaig, Nova Scotia.

***Beyrichia tumida* (Ulrich).**

Ctenobolbina tumida Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 11, pl. 7, figs. 5a-5b.

Beyrichia tumida Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 285; p. 292, fig. 24; p. 294, fig. 33.

Richmond (lower): McKinneys and Moreland, Kentucky.

Holotype and *plesiotype*.—Cat. Nos. 41326, 41327, U.S.N.M.

BEYRICHIA TUMIFRONS Hall. See *Ctenobolbina ciliata*.

***Beyrichia venusta* Billings.**

Beyrichia venusta Billings, Geol. Surv. Canada, Cat. Sil. Foss. Anticosti, 1866, p. 68.

Beyrichia decora Billings, *ibid.*, p. 67.

Anticostian (Jupiter River): East Point, Chaloupe River, Jumpers, etc., Anticosti.

Observation.—*B. decora* was based on the female form of *B. venusta*.

***Beyrichia waldronensis* Ulrich and Bassler.**

Beyrichia waldronensis Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 286, pl. 27, figs. 9, 10.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 355, fig. 1663b, c.

Niagaran (Waldron): Waldron, Indiana.

Cotypes.—Cat. No. 41660, U.S.N.M.

BEYRICHIA WALLPACKENSIS Weller. See *Kluedenia wallpackensis*.

BILLINGSSELLA Hall and Clarke. Genotype: *Orthis coloradoensis* Shumard.

Kutorgina Hall and Clarke (not Walcott), Pal. New York, 8, pt. 1, 1892, pp. 90-94.

Billingsella Hall and Clarke, 11th Ann. Rep. State Geol. New York, 1892, p. 273; 45th Ann. Rep. New York State Mus., 1892, p. 589; Pal. New York, 8, pt. 1, 1892, pp. 230-231.—Schuchert (part), Bull. U. S. Geol. Surv., 87, 1892, p. 158.—Walcott (part), Proc. U. S. Nat. Mus., 28, 1905, pp. 227-229.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 210.—Walcott, Smiths. Misc. Coll., 53, 1908, pp. 142 and 148, pl. 11; Mon. U. S. Geol. Surv., 51, 1912, p. 749.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 380.

***Billingsella coloradoensis* (Shumard).**

Orthis coloradoensis Shumard, Trans. Acad. Sci. St. Louis, 1, 1860, p. 627.

Orthis pepina Hall, 16th Ann. Rep. New York State Cab. Nat. Hist., 1863, pp. 134-135, pl. 6, figs. 23-27.—Whitfield, Geol. Wisconsin, 4, pt. 3, 1882, pp. 170-171, pl. 1, figs. 4, 5.

Orthis? (*Orthisina?*) *pepina* Hall, 2d Ann. Rep. State Geol. New York, 1883, pl. 8, figs. 1, 2.

Billingsella coloradoensis—Continued.

Orthis (*Billingsella*) *pepina* Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 96.

Billingsella pepina Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 230, pl. 7, figs. 16–19; pl. 7a, figs. 7–9.

Billingsella coloradoensis Walcott, Mon. U. S. Geol. Surv., 32, pt. 2, 1899, pp. 450–451, pl. 61, figs. 1, 1a–d; Proc. U. S. Nat. Mus., 28, 1905, pp. 231–234.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 210.—Walcott, Mon. U. S. Geol. Surv., 51, 1912, pp. 299, 751, fig. 6, pl. 85, figs. 1, 1a–z.

Ozarkian (*Oneota*): Stillwater, Washington County, Minnesota. Middle and Upper Cambrian of Montana, Texas, Wisconsin, etc.

Pteriotypes.—Cat. Nos. 34774, 34776, U.S.N.M.

Billingsella dice Walcott.

Billingsella dice Walcott, Proc. U. S. Nat. Mus., 28, 1905, p. 234; Mon. U. S. Geol. Surv., 51, 1912, p. 754.

Lower Ordovician (drift boulder of sandstone): St. Albans, Franklin County, Vermont.

Holotype and *paratypes*.—Cat. No. 52248, U.S.N.M.

Billingsella(?) grandæva (Billings).

Orthisina grandæva Billings, Canadian Nat. Geol., 4, 1859, p. 349, fig. 1; Geol. Canada, 1863, p. 113, fig. 21.—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, p. 540, fig.

Canadian (*Romaine*): Mingan Islands, Canada.

Observation.—See *Orthis piger* for a possible synonym.

BILLINGSSELLA LAURENTINA Hall and Clarke. See *Orthis(?) laurentina*.

BILLINGSSELLA PEPINA Hall and Clarke. See *Billingsella coloradoensis*.

Billingsella(?) primordialalis (Whitfield).

Streptorhynchus? primordiale Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 301, pl. 24, fig. 7.—Lealey, Geol. Surv. Pennsylvania, Rep., P 4, 1890, p. 1096, fig.—Seely, Rep. State Geol. Vermont, 7, 1910, pl. 52, fig. 7.

Canadian (*Beekmantown*): Fort Cassin, Vermont.

BILLINGSIA Ford. See *Elkania* Ford.

BILLINGSIA Walcott. See *Matherella* Walcott.

BILLINGSIA PRETIOSA Ford. See *Acrothele pretiosa*.

BILLINGSIA SARATOGENSIS Walcott. See *Matherella saratogensis*.

BILLINGSITES Hyatt.

Genotype: *Ascoceras canadense* Billings.

Billingsites Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 278.—Zittel, Handb. Pal., 2, 1884, p. 373.—Hyatt, Zittel-Eastman, Textb. Pal., 1, 1900, p. 516; 2d ed., 1913, p. 597.

Billingsites canadensis (Billings).

Ascoceras Canadense Billings, Geol. Surv. Canada, Rep. Progr. for 1853–1856, 1857, p. 310; Geol. Canada, Geol. Surv. Canada, 1863, p. 218, fig. 227; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 23 (loc. ref.).—Miller, N. A. Geol. Pal., 1889, p. 432, fig. 726.

Billingsites canadense Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 278 (gen. ref.).

Richmond (*English Head* and *Charleton*): *English Head*, etc., *Anticosti*.

BILOBITES Linnæus.Genotype: *Anomia biloba* Linnæus.

Bilobites Linnæus, Syst. Naturæ, ed. Muller, 6, 1775, p. 325.—Zittel, Handb. Pal., 1, Munich, 1880, p. 674.—Nathorst, Kongl. Sven. Vet.-Akad. Handl., 18, No. 7, 1881, pp. 38, 87.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th ser., 1, 1884, p. 549.—Hall, Bull. Geol. Soc. Amer., 1, 1889, p. 21.—Dawson, Quart. Jour. Geol. Soc. London, 46, 1890, p. 595.—Beecher, Amer. Jour. Sci., 3d ser., 42, 1891, p. 51; 44, 1892, p. 152.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 204, 223; 11th Ann. Rep. New York State Geol., 1894, p. 269.—Koken, Die Leitfossilien, Leipzig, 1896, p. 234.—Cummings, Amer. Jour. Sci., 4th ser., 1903, p. 40.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 259.

Dicelosis King, Mon. Permian Fossils England, Pal. Soc., 1850, p. 106.

Bilobites acutifolius (Ringueberg).

Orthis acutifolia Ringueberg, Proc. Acad. Nat. Sci. Philadelphia, 1888, p. 134, pl. 7, fig. 5.—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 507, figs. *Bilobites acutifolius* Beecher, Amer. Jour. Sci., 3d ser. 42, 1891, p. 52, pl. 1, fig. 1. Clinton (Rochester): Lockport, New York.

Bilobites bilobus (Linnæus).

Anomia biloba Linnæus, Systema Naturæ, ed. 12, 1767, p. 1154.
Delthyris sinuatus Hall, Geol. New York, Rep. 4th Dist., 1843, p. 105, fig. 8.—Owen (Hall), Amer. Jour. Sci. Arts, 48, 1845, p. 313, fig. 8.
Spirifer bilobus Hall, Amer. Jour. Sci., 2d ser., 20, 1849, p. 228; Pal. New York, 4, 1852, p. 260, pl. 54, fig. 1.
Orthis biloba Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 85.—Davidson, Mon. British Sil. Brach., Pal. Soc., 1869, p. 206, pl. 26, figs. 10-15.—Safford, Geol. Tennessee, 1869, p. 315, fig. 10.—Hall, 11th Rep. State Geol. Indiana, 1882, p. 286, pl. 27, fig. 16.—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 510, fig.
Bilobites bilobus Beecher, Amer. Jour. Sci., 3d ser., 42, 1891, p. 52, pl. 1, fig. 28.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 190, 204, 205, 223, pl. 5B, figs. 11-14.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 259.
 Niagara: Lockport, etc., New York; Ontario (Rochester); Waldron, Indiana, and Newsom, Tennessee (Waldron).
 Anticostian (Gun River and Jupiter River): Anticosti.

BISTRAMIA Hoek.Genotype: *B. elegans* Hoek.

Bistramia Hoek, Neues Jahrb. Min., Geol., Pal., 34, 1912, p. 247.

Bistramia elegans Hoek.

Bistramia elegans Hoek, Neues Jahrb. Min., Geol., Pal., 34, 1912, p. 247, pl. 8, figs. 12, 13.
 Ordovician: Totorapampa, Bolivia.

BLASTOIDOCRINUS Billings.Genotype: *B. carcharisedens* Billings.

Blastoidocrinus Billings, Geol. Surv. Canada, dec. 4, 1859, p. 18.—Chapman, Canadian Jour., n. s., 6, 1861, p. 514, footnote; Expos. Min. Geol. Canada, 1864, p. 108.—Zittel, Handb. Pal., 1, 1879, p. 423.—Etheridge and Carpenter, Ann. Mag. Nat. Hist., 5th ser., 9, 1882, p. 214, footnote.—Miller, N. A. Geol. Pal., 1889, p. 229.—Jaekel, Stammesgeschichte d. Pelmatozoen, 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 389.—Bather, Rep. Mus. Assoc., 1900, p. 103; Treatise on Zool., pt. 3, Echinoderma 1900, p. 80, fig. 3.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 477.—Hudson, Bull. New York State Mus., 149, 1911, p. 203.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 167.

Blastoidocrinus carchariasædens Billings.

Blastoidocrinus carchariasædens Billings, Can. Org. Rem., dec. 4, Geol. Surv. Canada, 1859, p. 18, pl. 1, figs. 1a-n; fig. 6, p. 20.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 81, fig. 3, 1, 2.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 478, fig. 1787.

Blastoidocrinus carcharidens Miller, N. A. Geol. Pal., 1889, p. 229, text fig. 257.—Hudson, Bull. New York State Mus., 107, 1907, p. 97, figs. 1, 2; pls. 1-7; p. 149, 1911, pls. 1-4.

Chazyan: Caughnawaga, Islands of Montreal, Jesus, and Bizard, Canada; Valcour Island, New York (Valcour).

BLASTOPHYCUS Miller and Dyer. Genotype: *B. diadematum* Miller and Dyer.

Blastophycus Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 24.—Miller, N. A. Geol. Pal., 1889, p. 109.

Blastophycus diadematum Miller and Dyer.

Blastophycus diadematum Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 24, pl. 1, figs. 1, 2.—Miller, N. A. Geol. Pal., 1889, p. 109, fig. 17.

Eden (Economy): Cincinnati, Ohio, and vicinity.

BLOTHROPHYLLUM Billings.

Genotype: *B. decorticatum* Billings.

Blothrophyllum Billings, Canadian Jour., n. s., 4, 1859, p. 129.—Nicholson, Canadian Nat., n. s., 7, 1874, p. 139; Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 18.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 112.—Miller, N. A. Geol. Pal., 1889, p. 174.—Sherzer, Amer. Geol., 7, 1891, pp. 284-289.—Lambe, Contr. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 171.

Blothrophyllum cæspitosum Rominger.

Blothrophyllum cæspitosum Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 114, pl. 42.

Niagaran: Point Detour, Michigan.

Blothrophyllum cinctosum Greene.

Blothrophyllum cinctosum Greene, Contr. Indiana Pal., 2, pt. 2, 1906, p. 34, pl. 7, figs. 7, 8.

Niagaran (Louisville): Near Louisville, Kentucky.

Blothrophyllum niagarense Davis.

Blothrophyllum niagarense Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 99, fig. 10.

Niagaran (Louisville): Near Louisville, Kentucky.

BLUMENBACHIUM Roemer. See *Astræospongia* Roemer.**BLUMENBACHIUM MENISCUS** Roemer. See *Astræospongia meniscus*.**BODMANIA** Miller and Faber.

Genotype: *B. insuetum* Miller and Faber.

Bodmania Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 22.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 780.

Observation.—Probably the same as *Cyrtodonta*.

Bodmania insuetum Miller and Faber.

Bodmania insuetum Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 23, pl. 1, figs. 5-7.

Richmond (Whitewater): Richmond, Indiana.

BODMANIA VENTRICOSA Miller and Faber. See *Whitella ventricosa*.

BOLBOCEPHALUS Whitfield.Genotype: *Bathyrurus seelyi* Whitfield.

Bolbocephalus Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1890, p. 36.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 705.

Bolbocephalus seelyi (Whitfield).

Bathyrurus? *Seelyi* Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 339, pl. 33, fig. 12-18.

Bolbocephalus *Seelyi* Whitfield, Bull. Amer. Mus. Nat. Hist., 3, 1890, pl. 3, figs. 1-8.—Seely, Rep. State Geol. Vermont, 7, 1910, pl. 57, figs. 1-3.

Canadian (Beekmantown): Fort Cassin, Vermont, and Beekmantown, New York.

Bolbocephalus? truncatus Whitfield.

Bolbocephalus? truncatus Whitfield, Bull. Amer. Mus. Nat. Hist., 3, 1890, p. 37, pl. 2, figs. 6-8.

Canadian (Beekmantown): Fort Cassin, Vermont.

BOLBOPORITES Pander.Genotype: *B. mitralis* Pander.

Bolboporites Pander, Beitrag zur Geognosie Russlands, 1830, p. 106.—Edwards and Haime, Mon. d. Polyp. Foss. Terr. Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), p. 246.—Eichwald, Leth. Rossica, 1, sect. 1, 1860, p. 495.—Miller, N. A. Geol. Pal., 1889, p. 174.

Bolboporites americanus Billings.

Bolboporites americanus Billings, Canadian Nat. Geol., 4, 1859, p. 429, figs. 3-6; Geol. Surv. Canada, 1863, p. 124, fig. 124a-d.—Chapman, Canadian Jour., n. s., 8, 1863, p. 195, fig. 165b; Expos. Min. Geol. Canada, 1864, p. 167, fig. 165b.—Miller, N. A. Geol. Pal., 1889, p. 174, fig. 140.—Ruedemann, Bull. New York State Mus., 49, 1901, p. 11, pl. 1, fig. 1.

Chazy: Montreal and Mingan Islands, Canada; New York; Rysedorph Hill, Rensselaer County, New York (Rysedorph).

BOLIVIANA Salter.Genotype: *B. melocactus* Salter.

Boliviana Salter, Quart. Jour. Geol. Soc. London, 17, 1861, p. 71.

Boliviana bipennis Salter.

Boliviana bipennis Salter, Quart. Jour. Geol. Soc. London, 17, 1861, p. 72, pl. 5, fig. 11.

Ordovician(?): Valley of Unduavi, Bolivia.

Boliviana melocactus Salter.

Boliviana melocactus Salter, Quart. Jour. Geol. Soc. London, 17, 1861, p. 71, pl. 5, fig. 9.

Ordovician(?): Valley of Aceromarka, Bolivia.

Boliviana proboscidea Salter.

Boliviana proboscidea Salter, Quart. Jour. Geol. Soc. London, 17, 1861, p. 71, pl. 5, fig. 10.

Ordovician(?): Valley of Aceromarka, Bolivia.

BOLLIA Jones and Holl.Genotype: *B. bicollina* Jones and Holl.

Bollia Jones and Holl, Ann. Mag. Nat. Hist., 5th ser., 17, 1886, p. 360.—Krause, Zeits. d. d. geol. Gesell., 41, 1889, p. 13.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 705.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 668.—Koken, Die Leitfossilien, Leipzig, 1896, p. 40, fig. 26D.—Ulrich, Zittel-Eastman Textb. Pal., 1, 1900, p. 644.—Grabau, Bull. New York State Mus., 45, 9, 1901, p. 219.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 219.—Bonnema, Mitt. Min. Geol. Inst. Groningen, 2, 1909, p. 57.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 351.—Bassler, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 738.

BOLLIA CLARKEI Ulrich. See *Klœdenella clarkei*.

Bollia cornucopiæ Ruedemann.

Bollia cornucopiæ Ruedemann, Bull. New York State Mus., 49, 1901, p. 82, pl. 6, figs. 1, 2.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

BOLLIA HALLI Ulrich. See *Klœdenella halli*.

Bollia lata Jones.

Beyrichia lata Hall (part), Pal. New York, 2, 1852, p. 301, pl. A 66, fig. 10b (not figs. 10c-e=*Beyrichia lata*).

Bollia lata Jones, Amer. Geol., 4, 1889, p. 339.—Grabau and Shimer N. A. Index Fossils 2, 1910, p. 352.

Clinton: New York, Pennsylvania, Maryland, etc.

Bollia lata brasiliensis Clarke.

Bollia lata var. *brasiliensis* Clarke, Archivos. Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 22, pl. 2, figs. 30, 31—Katzner, Grundz. d. Geol. d. unt. Amazonas, Leipzig, 1903, pl. 16, fig. 18a, b.

Silurian: Rio Trombetas, Brazil.

Bollia persulcata (Ulrich).

Beyrichia persulcata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 12, pl. 7, fig. 6.

Bollia persulcata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 116, figs. 3a-d.

Beyrichia buchiana Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 16, pl. 3, fig. 25.

Eden, Maysville, and Richmond: Cincinnati, Ohio, and vicinity.

Holotype.—Cat. No. 41524, U.S.N.M.

Bollia pumila Ulrich.

Bollia pumila Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 117, pl. 12, figs. 1a, 1b.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 1042, pl. 53, figs. 12, 12a.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 351, figs. 1660z, z'.

Richmond (Waynesville): Weisberg, etc., Indiana; Waynesville, etc., Ohio.

Holotype.—Cat. No. 41691, U.S.N.M.

Bollia regularis (Emmons).

Beyrichia regularis Emmons, Amer. Geology, 1, pt. 2, 1855, p. 219, fig. 74b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 91, fig.

Bollia regularis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 669 (gen. ref.).—Ulrich and Basler, Proc. U. S. Nat. Mus., 35, 1908, p. 288, figs. 12-14.

Richmond (Arnheim): Waynesville, etc., Ohio; Indiana; Kentucky.

Plesiotypes.—Cat. No. 41516, U.S.N.M.

Bollia semilunata Jones.

Bollia semilunata Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 548, pl. 21, figs. 9, a, b.

Richmond (Charleton and English Head): South of Junction Cliff, etc. Anticosti.

Bollia subæquata Ulrich.

Bollia subæquata Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 669, pl. 46, figs. 26-29.

Trenton (Prosser): Cannon Falls, St. Paul, etc., Minnesota.

Cotypes.—Cat. Nos. 41519, 41520, U.S.N.M.

BOLLIA SYMMETRICA of authors. See *Kloedenella symmetrica*.

BOLLIA TYPA Miller. See *Dilobella typa*.

Bollia unguuloidea Ulrich.

Bollia unguuloidea Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 669, pl. 46, figs. 23-25.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 351, fig. 1658, 10, 10'.

Trenton (Prosser): Goodhue County, Minnesota.

BOREASTER Lambe.

Genotype: *B. lowi* Lambe.

Boreaster Lambe, Cruise of the Neptune in 1903-4, App. 4, 1906, p. 323.

Boreaster lowi Lambe.

Boreaster lowi Lambe, Cruise of the "Neptune" in 1903-4, App. 4, 1906, p. 323. Niagaran: Beechy Island, Lancaster Sound, Arctic America.

BOTRYOCRINITES of authors. See *Botryocrinus Angelin*.

BOTRYOCRINUS Angelin.

Genotype: *B. ramosissimus* Angelin.

Botryocrinus Angelin, Icon. Crin. Suec., 1878, 24, pl. 20, fig. 8; pl. 23, fig. 14.—Zittel, Handb. Pal., 1, 1879, p. 352.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 320 (Rev. Pal., pt. 1, p. 97); *ibid.*, 1886, pp. 112, 115, 148 (Rev. Pal., pt. 3, sec. 2, pp. 188, 191, 224); *ibid.*, 1890, p. 380.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 324, pl. 14, fig. 30; pl. 15, figs. 9, 13; 7, 1891, p. 392; Kongl. Sv. Vet.-Akad. Handl., 25, No. 2, 1893, p. 116, pl. 5, fig. 160; pl. 6, fig. 193; Nat. Science, 12, 1898, p. 342.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 65, fig. 34.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 179, fig. 97.—Springer, Amer. Geol., 26, 1900, p. 133.—Bather, *ibid.*, p. 308.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 157.—Zittel, Grundzuge Pal., 1, 1910, p. 154.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 506.

Botryocrinites Bather, Kongl. Sv. Vet.-Akad. Handl., 25, No. 2, 1893, pp. 114, 119, fig. 17.

Sicyocrinus Angelin, Icon. Crin. Suec., 1879, p. 23, pl. 4, fig. 9; pl. 16, fig. 5.—Wachsmuth and Springer, Rev. Pal., 1, 1879, pp. 62, 99.—Zittel, Handb. Pal., 1, 1879, p. 352.

Botryocrinus nucleus (Hall).

Dendrocrinus nucleus Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 15, figs. 7-9.

Cyathocrinus nucleus Hall, *ibid.*, mus. ed., 1879, p. 136, pl. 15, figs. 7-9; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 265, pl. 14, figs. 7-9.

Homocrinus nucleus Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 144 (Rev. Pal., 3, sec. 2, p. 220).

Botryocrinus nucleus Bather, Crinoidea Gotland, 1893, p. 104.

Niagaran (Waldron): Waldron, Indiana.

Botryocrinus polyxo (Hall).

Cyathocrinus polyxo Hall, Trans. Albany Institute, 4, 1863, p. 199; 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, pl. 15, figs. 10-17; mus. ed., p. 135, pl. 15, figs. 10-17.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 310 (Rev. Pal., 1, p. 87).—Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 264, pl. 14, figs. 10-17.

Homocrinus polyxo Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 144 (Rev. Pal., pt. 1, p. 87).

Botryocrinus polyxo—Continued.

Botryocrinus polyxo Bather, Crin. Gotland, 1893, p. 105.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 66, pl. 14, fig. 12.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 506.

Niagaran: Waldron, Indiana (Waldron); Bridgeport, Illinois (Racine).

BRACHIOSPONGIA Marsh.

Genotype: *Scyphia digitata* Owen.

Brachiospongia Marsh, Amer. Jour. Sci. and Arts, 2d ser., 44, 1867, p. 88.—Hovey, Trans. Kansas Acad. Sci., 3, 1875, p. 10; reprint, 1896, p. 111.—Roemer, Leth. geog., 1, Theil, Leth. Pal., Erste Lief, 1880, p. 319.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 9, 1886, pp. 246, 247.—Beecher, Mem. Peabody Mus., Yale Univ., 2, 1889, pp. 1, 13.—Miller, N. A. Geol. Pal., 1889, p. 155.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1, 1891, p. 66.—Rauff, Palaeontographica, 40, 1894, p. 272.—James, Amer. Nat., 29, 1895, p. 542, fig. 5.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 17.

Brachiospongia digitata (Owen).

——— Troost, Mem. Geol. Soc. France, 3, 1838, p. 95, pl. 11, figs. 8–10.

Scyphia digitata Owen, 2d Rep. Geol. Surv. Kentucky, 1857, p. 111.—Hovey, Trans. Kansas Acad. Sci., 3, 1875, p. 10; reprint, 1896, p. 111.

Brachiospongia Lyonii Marsh, Amer. Jour. Sci. and Arts, 2d ser., 44, 1867, p. 88.

Brachiospongia Roemerana Marsh, Amer. Jour. Sci. and Arts, 2d ser., 44, 1867, p. 88.—Hovey, Trans. Kansas Acad. Sci., 3, 1875, p. 10, fig. 1; reprint, 1896, p. 112, fig. 1.—Roemer, Leth. geog., 1, Theil, Leth. Pal., Erste Lief, 1880, p. 319, fig. 61.

Brachiospongia hoveyi Marsh, Trans. Kansas Acad. Sci., 1874, p. 344.

Brachiospongia digitata James, J. F., Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 248.—Beecher, Mem. Peabody Mus., Yale University, 2, 1889, p. 19, figs. 1–4; pl. 1, figs. 1, 2; pl. 2, figs. 1–7; pl. 3, figs. 1, 2; pl. 4, figs. 1–8.—Nettle-roth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 29, pl. 25, fig. 3; pl. 36, figs. 1, 2.—Miller, N. A. Geol. Pal., 1889, p. 155, fig. 92.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1, 1891, p. 66, fig. 6.—Rauff, Palaeontographica, 40, 1894, p. 272, figs. 52–55.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 17, fig. 26.

Trenton (Bigby): Near Bright's Mill, Franklin County, Kentucky; Davidson County, Tennessee.

BRACHIOSPONGIA HOVEYI Marsh. See *Brachiospongia digitata*.

Brachiospongia laevis Foerste.

Brachiospongia sp. Beecher, Mem. Peabody Mus., 2, pt. 1, 1889, p. 19.

Brachiospongia laevis Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 300, pl. 8, fig. 2.

Maysville (Mount Hope): Near Paint Lick, Madison County, Kentucky.

BRACHIOSPONGIA LYONII Marsh. See *Brachiospongia digitata*.

BRACHIOSPONGIA ROEMERANA Marsh. See *Brachiospongia digitata*.

Brachiospongia tuberculata James.

Brachiospongia tuberculata James, Palaeontologist, No. 4, 1879, p. 25.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 248; 14, pt. 1, 1891, p. 67.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, pl. 10, fig. 5.

Richmond (Liberty): Seven miles west of Wilmington, Ohio.

BRACHYASPIS Salter.

Genotype: *Isotelus rectifrons* Portlock.

Brachyaspis Salter, Mon. Brit. Tril., Pal. Soc., 1866, p. 148.—Zittel, Handb. Pal., 2, 1885, p. 609.—Koken, Die Leitfossilien, Leipzig, 1896, p. 28.—Raymond, Trans. and Proc. Roy. Soc. Canada, 5, 3d ser., sec. 4, 1912, p. 115.

Brachyaspis alacer (Billings).

Asaphus alacer Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 26, fig. 9a.

Brachyaspis alacer Raymond, Trans. and Proc. Roy. Soc. Canada, 3d ser., 5, sec. 4, 1912, p. 119, pl. 2, fig. 3.

Richmond (Charleton) and Gamachian: Charleton Point, etc., Anticosti.

Brachyaspis altilis Raymond.

Asaphus platycephalus Billings (not Stokes), Cat. Sil. Foss. Anticosti, 1866, pp. 24, 26, fig. 9b.

Brachyaspis altilis Raymond, Trans. and Proc. Roy. Soc. Canada, 3d ser., 5, sec. 4, 1912, p. 119, pl. 2, figs. 4, 5; Bull. Victoria Mem. Mus., 1, 1913, p. 47, pl. 4, figs. 3, 7.

Richmond (Charleton): English Head, Anticosti.

Brachyaspis notans (Billings).

Asaphus notans Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 24, fig. 8; p. 60.

Brachyaspis notans Raymond, Trans. and Proc. Roy. Soc. Canada, 3d ser., 5, sec. 4, 1912, p. 118, pl. 1, fig. 1.

Richmond (English Head): English Head, Anticosti.

Gamachian (Ellis Bay): Gamache Bay, Anticosti.

BRACHYMERUS Shaler. See *Anastrophia* Hall.

BRACHYMERUS REVERSUS Shaler. See *Parastrophia reversa*.

BRACHYPRION Shaler. See *Stropheodonta* subgenus *Brachyprion*.

BRACHYPRION VENTRICOSA Shaler. See *Stropheodonta* (*Brachyprion*) *philomena*.

BROCKOCYSTIS Foerste.

Genotype: *Apiocystites tecumseth* Billings.

Brockocystis Foerste, Bull. Sci. Lab. Denison Univ. 17, 1914, p. 468.

Brockocystis clintonensis (Parks).

Lepadocystis clintonensis Parks, Amer. Jour. Sci., 29, 1910, p. 404, figs. 1, 2.

Brockocystis clintonensis Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 473.

Upper Medinan (Cataract): Forks of Credit River, Ontario.

Brockocystis huronensis (Billings).

Apiocystites Huronensis Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 91, fig. 28.—Schuchert, Smiths. Misc. Coll., 47, 1904, p. 212.

Brockocystis huronensis Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 473.

Upper Medinan (Cataract): Cabots Head, shore of Lake Huron, Canada.

Brockocystis tecumseth (Billings).

Apiocystites? Tecumseth Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 91.—Schuchert, Smiths. Misc. Coll., 47, pt. 2, 1904, p. 211.

Brockocystis tecumsethi Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 469, pl. 5, fig. 2.

Upper Medinan (Cataract): Near South Bay, Manitoulin Island, Lake Huron.

BRÖGGERIA Walcott. See *Obolus* subgenus *Bröggeria*.

BRONGNIARTIA Eaton. See *Homalonotus* Koenig.

BRONGNIARTIA CARCINODEA Eaton. See *Triarthrus becki*.

BRONGNIARTIA ISOTELEA Eaton. See *Isotelus gigas*.

BRONGNIARTIA PLATYCEPHALA Harlan. See *Homalonotus delphinocephalus*.

BRONGNIARTIA TRENTONENSIS Collie. See *Homalonotus trentonensis*.

BRONTES Goldfuss. See *Goldius Dekoninck*.

BRONTEUS Goldfuss. See *Goldius Dekoninck*.

BRYOGRAPTUS Lapworth.

Genotype: *B. kjerulfi* Lapworth.

Bryograptus Lapworth, Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 164.—Tullberg, Sveriges Geol. Unders., Ser. C, No. 55, 1883, p. 12.—Hermann, Geol. Mag., dec. 3, 1886, p. 17.—Lapworth, Trans. Royal Soc. Canada, 4th ser., 1887, p. 168.—Nicholson and Marr, Geol. Mag., dec. 4, 2, 1895, pp. 530, 531, fig.—Koken, Die Leitfossilien, Leipzig, 1896, p. 328.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, No. 4, 1896, p. 265.—Roemer and Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 583.—Elles, Quart. Jour. Geol. Soc., London, 54, 1898, p. 472.—Elles and Wood, Mon. Brit. Graptolites, Pal. Soc., 1902, p. 87.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 638, 639.

BRYOGRAPTUS KJERULFI Matthew. See *Staurograptus dichotomus*.

BRYOGRAPTUS KJERULFI Ruedemann. See *Bryograptus pusillus*.

Bryograptus lapworthi Ruedemann.

Bryograptus n. sp., Ruedemann, Ann. Rep., New York State Pal., 1902, p. 556.

Bryograptus lapworthi Ruedemann, Mem., New York State Mus., 7, pt. 1, 1904, pp. 639–641, pl. 5, figs. 1–12, fig. 47.

Canadian (Deepkill, Tetragraptus zone): Deepkill, Rensselaer County, New York.

BRYOGRAPTUS LENTUS Matthew. See *Staurograptus dichotomus*.

BRYOGRAPTUS? MULTIRAMOSUS Gurley. See *Dictyonema flabelliforme*.

BRYOGRAPTUS PATENS Matthew. See *Staurograptus dichotomus*.

Bryograptus pusillus Ruedemann.

Bryograptus Kjerulfi Ruedemann (not Lapworth), Ann. Rep. New York State Pal., 1902, p. 556.

Bryograptus pusillus Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 641, 642, pl. 4, figs. 21, 22.

Canadian (Deepkill, Tetragraptus zone): Deepkill, Rensselaer County, New York.

Bryograptus spinosus Matthew.

Bryograptus spinosus Matthew, Trans. New York Acad. Sci., 14, 1895, p. 269, pl. 48, figs. 3a, b.—Gurley, Jour. Geol., 4, 1896, p. 93.—Ruedemann, Bull. New York State Mus., 69, 1903, p. 938 (loc. occ.).

Canadian (Bretonian-Div. C 3c): St. John, New Brunswick.

Observation.—Possibly the same as *Staurograptus dichotomus* Emmons.

BUCANELLA Meek.

Genotype: *B. nana* Meek.

Bucanella Meek, Proc. Amer. Phil. Soc., 11, 1870, p. 426.—Miller, N. A. Geol. Pal., 1889, p. 298.—Koken, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band 6, 1889, p. 390.

Bucaniella Koken, Die Leitfossilien, Leipzig, 1896, pp. 100, 392, 558; Neues Jahrb. f. Min., Geol. Pal., 1, 1896, pp. 6, 10.—Clarke, Archives Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 36.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 612.

BUCANELLA Koken (part). See *Kokenospira* Bassler, and *Tetranota* Ulrich and Scofield.

Bucanella nana Meek.

Bucanella nana Meek, Proc. Amer. Phil. Soc., 11, 1870, p. 426.
Lower Ordovician: Crater's Falls, Colorado.

Bucanella trilobata (Conrad).

Planorbis trilobatus Conrad, Ann. Rep. New York State Geol. Surv., 1838, p. 113.
Bellerophon trilobatus Hall, Geol. Rep. 4th Dist. New York, 1843, p. 48, figs. 6, 7; pl. 2, figs. 6, 7.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 88, fig. 6.
Bucania trilobatus Hall, Pal. New York, 2, 1852, p. 13, pl. 4 (bis), figs. 5a, b, and part of 3d; p. 93, pl. 28, figs. 10a, b.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 822, fig. 624.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 5, figs. 6, 7.—Foerste, Bull. Sci. Lab. Denison Univ., 2, pt. 1, 1887, p. 103, pl. 8, figs. 33a, b.—Grabau, Bull. New York State Mus., 45, 1901, p. 213, fig. 144.

Bellerophon (*Bucania*) *trilobatus* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 549, pl. 27, figs. 33a, b.

Bucaniella trilobata Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 36 (gen. ref.).

Upper Medinan and Clinton: Lockport, Medina, etc., New York; Ontario; Arisaig, Nova Scotia.

Bucanella trilobata viromundo (Clarke).

Bucaniella trilobata var. *viro-mundo* Clarke, Archivos Mus. Nac. Rio de Janeiro, author's Eng. ed., 1900, p. 18, pl. 2, figs. 20-22.

Silurian: Rio Trombetas, Brazil.

BUCANIA (part) of authors. See *Tetranota* Ulrich and Scofield, *Salpingostoma* Roemer, and *Bucanopsis* Ulrich.

BUCANIA Hall.

Genotype: *Bellerophon sulcatus* Emmons.

Bucania Hall, Pal. New York, 1, 1847, p. 32.—Verneuil, Bull. Soc. Geol. France, 2d ser., 5, 1848, p. 376, footnote.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 66; 14th Rep., 1861, p. 93.—Meek, Proc. Chicago Soc. Nat. Hist., 1, 1866, p. 11.—Miller, Cincinnati Quart. Jour. Sci., 1874, p. 307.—Hall, Pal. New York, 5, pt. 2, 1879, p. 121.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th ser., 1880, 1, p. 130, 150.—Zittel, Handb. Pal., 2, 1882, p. 184.—Koninck, Ann. d. Mus. Royal d'Hist. Nat. de Belgique, 8, 1883, p. 148.—Nettelroth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 159.—Koken, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 6, 1889, pp. 379, 385.—Miller, N. A. Geol. Pal., 1889, p. 398.—Barrois, Ann. Soc. Geol. du Nord, 19, Lille, 1891, p. 216.—Koken, Die Leitfossilien, Leipzig, 1896, p. 100, text fig. 78, fig. 1; Bull. l'Acad. Imp. Sci. St. Petersburg, 7, 1897, p. 120.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 850.—Koken, Neues Jahrb. f. Min., Geol. Pal., 1, 1898, p. 6.—Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 35.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 213; Bull. New York State Mus., 45, 1901, p. 213.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 52.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 948.—Grabau and Shimer, N. A. Index Fossils, 3, 1909, p. 613.—Dall, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 521.

BUCANIA ANGUSTATA Hall. See *Tremanotus angustata*.

Bucania bellapuncta Hall.

Bucania bellapuncta Hall, Pal. New York, 2, 1852, p. 93, pl. 28, fig. 9.

Lower Clinton: Walcott, New York.

BUCANIA (BELLEROPHON) BIDORSATA Hall. See *Tetranota bidorsata*.

BUCANIA BUELLI Whitfield. See *Salpingostoma buelli*.

BUCANIA (TREMANOTUS) BUELLI Whitfield. See *Salpingostoma buelli*.

BUCANIA CATILLOIDES Raymond. See *Oxydiscus catilloides*.

BUCANIA CHAMPLAINENSIS Whitfield. See *Bucania sulcatina*.

BUCANIA CHICAGOENSIS McChesney. See *Tremanotus chicagoensis*.

BUCANIA COSTATUS Miller. See *Dyeria costata*.

Bucania crassa Ulrich.

Bucania crassa Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 893, pl. 67, figs. 46-48.—
Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 955, pl. 39,
figs. 4-4b.

Richmond (Elkhorn): Near Richmond, Indiana.

Holotype.—Cat. No. 45714, U.S.N.M.

BUCANIA CRASSOLARE McChesney. See *Tremanotus crassolaris*.

Bucania cyclostoma Calvin.

Bucania cyclostoma Calvin, Bull. Lab. Nat. Hist. State Univ. Iowa, 1, 1890, p.
181, pl. 1, figs. 2a, b.

Niagaran: Maquoketa, Iowa.

Bucania elliptica Ulrich and Scofield.

Bucania elliptica Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 888,
pl. 66, figs. 11 and 12.

Trenton (Prosser): Near Cannon Falls, Minnesota.

Holotype.—Cat. No. 45715, U.S.N.M.

Bucania emmonsii Ulrich and Scofield.

Bucania emmonsii Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 887,
pl. 66, figs. 1-3.

Black River (Platteville): Cannon Falls and Fountain, Minnesota.

Stones River (Murfreesboro): Murfreesboro, Tennessee.

Cotypes.—Cat. Nos. 46049, 46050, U.S.N.M.

Bucania euomphaloides Owen.

Not recognized.

Bucania euomphaloides Owen, Geol. Surv. Indiana, 1862, p. 362, fig. 3.

Silurian: Locality not given.

Bucania exigua Foerste.

Bucania exigua Foerste, Bull. Sci. Lab. Denison Univ., 1, 1884, p. 99, pl. 13,
figs. 18a-d.

Bellerophon (Bucania) exigua Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889,
p. 288, pl. 6, fig. 3; Geol. Surv. Ohio, Pal., 7, 1893, p. 548, pl. 25, figs. 18a-b;
pl. 31, fig. 3; pl. 37A, figs. 2a-c.

Bellerophon exiguus Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 619.—
Savage, Bull. Illinois Geol. Surv., 23, 1913, p. 99, pl. 6, fig. 6.

Upper Medinan: Dayton and Todds Fork, Ohio; Hanover, Indiana (Brassfield);
Pike County, Missouri (Edgewood).

BUCANIA EXPANSA Hall. See *Salpingostoma expansa*.

Bucania fiscoelostriata (Foerste).

Bellerophon fiscoelostriatus Foerste, Bull. Sci. Lab. Denison Univ., 1, 1886, p. 99, pl. 13, figs. 19a-d; Proc. Boston Soc. Nat. Hist., 24, 1889, p. 287; Geol. Surv. Ohio, Pal., 7, 1893, p. 548, pl. 25, figs. 19a-e.
Upper Medinan (Brassfield): Near Dayton, Ohio.

Bucania frankfortensis Ulrich.

Bucania frankfortensis Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 891, pl. 66, figs. 30-33.
Trenton (Cynthiana): Frankfort, Kentucky.
Holotype.—Cat. No. 45716, U.S.N.M.

Bucania halli Ulrich and Scofield.

Bucania halli Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 886, pl. 66, figs. 4-8.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 614, fig. 822.
Black River: Cannon Falls, Minnesota (Platteville); Lincoln County, Missouri (Auburn); Mercer County, Kentucky (Lowville).
Cotypes.—Cat. Nos. 45717, 45718, U.S.N.M.

BUCANIA IMBRICATA Miller. See *Salpingostoma imbricata*.

Bucania intexta Hall.

Bucania intexta Hall, Pal. New York, 1, 1847, p. 217, pl. 33, figs. 4a-d.
Bellerophon intextus Emmons, Amer. Geology, 1, pt. 2, 1855, p. 166.
Trenton: Near Watertown, New York.

Bucania lindsleyi (Safford).

Bellerophon lindsleyi Safford, Geol. Tennessee, 1869, pl. 3 (G), figs. 3a, b, d, e.
Bucania lindsleyi Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 889, pl. 66, figs. 24 and 25.
Trenton: Dekalb County, Tennessee (Catheys): Near Cannon Falls, Minnesota (Prosser).
Holotype.—Cat. No. 45719, U.S.N.M.

Bucania micronema Ulrich.

Bucania micronema Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 892, pl. 66, figs. 26-29.
Trenton (Flanagan): Danville, Kentucky.
Holotype.—Cat. No. 45720, U.S.N.M.

Bucania minnesotensis Ulrich and Scofield.

Bucania minnesotensis Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pl. 66, figs. 9 and 10.
Black River (Platteville): Goodhue County, Minnesota.
Holotype.—Cat. No. 45721, U.S.N.M.

Bucania nana Ulrich.

Bucania nana Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 895, pl. 66, figs. 41-44.
Trenton: Near Burgin (Flanagan) and Covington, Kentucky.
Cotypes.—Cat. No. 45722, U.S.N.M.

Bucania nana subpatula Ulrich.

Bucania nana var. subpatula Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 896, pl. 66, figs. 45, 46.
Trenton: Near Burgin (Flanagan) and Covington, Kentucky.
Holotype.—Cat. No. 45723, U.S.N.M.

***Bucania nashvillensis* Ulrich.**

Bucania nashvillensis Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 890, pl. 66, figs. 36-40.

Trenton (Catheys): Dekalb County and Nashville, Tennessee.

Cotypes.—Cat. Nos. 45724, 45725, U.S.N.M.

BUCANIA OBSOLETA Miller. See *Tetranota obsoleta*.

***Bucania operta* (Foerste).**

Bellerophon (*Bucania*) *opertus* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 548, pl. 25, figs. 18c-d; pl. 37A, figs. 3a, b.

Upper Medinan (Brassfield): Near Dayton, Ohio, and Hanover, Indiana.

***Bucania peracuta* Ulrich.**

Bucania peracuta Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 896, pl. 66, figs. 34, 35.

Trenton (Catheys): Dekalb County, Tennessee.

Holotype.—Cat. No. 45726, U.S.N.M.

***Bucania perornata* Calvin.**

Bucania perornata Calvin, Bull. Lab. Nat. Hist., State Univ. Iowa, 1, 1890, p. 180, pl. 3, figs. 3a, b.

Niagaran: Maquoketa, Iowa.

BUCANIA PERVOLUTA McChesney. See *Tremantodus pervolutus*.

BUCANIA PUNCTATA Lincklaen. See *Bucania punctifrons*.

***Bucania punctifrons* (Emmons).**

Bellerophon punctifrons Emmons, Geol. Rep. 2d Dist. New York, 1842, p. 392, fig. 5.—Owen, Amer. Jour. Sci. and Arts, 47, 1844, p. 369, fig. 5.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 165, pl. 12, figs. 11a, 12; Manual Geol., 1860, p. 98, fig. 87.—Leasey, Geol. Surv. Pennsylvania, Rep. P. 4, 1889, p. 87, figs.

Bucania punctifrons Hall, Pal. New York, 1, 1847, p. 187.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 894, pl. 67, figs. 41-44.—Raymond, Bull. Amer. Pal., 3, 1902, pl. 19, figs. 9, 10.—Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 177, pl. 12, figs. 10-12.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 614.

Bucania punctata Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 2, fig. 5.

Retepora foliacea Hall, Pal. New York, 1, 1847, p. 78, pl. 26, figs. 9a, b.

Trenton: Middleville, Watertown, etc., New York; Canada; Central Tennessee; New Jersey.

Plesiotypes.—Cat. No. 45727, U.S.N.M. (Ulrich and Scofield).

BUCANIA RICHMONDENSIS Miller. See *Salpingostoma richmondensis*.

BUCANIA ROTUNDATA Hall. See *Bucania sulcatina*.

***Bucania rugatina* Ulrich.**

Bucania rugatina Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 890, pl. 66, figs. 13-15.

Trenton (Flanagan): Near Burgin, Kentucky.

Holotype.—Cat. No. 45728, U.S.N.M.

BUCANIA RUGOSA Lesley. See *Bellerophon rugosa*.

BUCANIA SCULPTILIS Miller. See *Salpingostoma sculptilis*.

***Bucania simulatrix* Ulrich.**

Bucania simulatrix Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 892, pl. 63, figs. 48, 49; pl. 67, fig. 45.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 955, pl. 42, figs. 9, 9a.

Richmond (Whitewater): Richmond, Indiana.

***Bucania singularis* Ulrich.**

Bucania singularis Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 894, pl. 66, fig. 47.

Trenton (Catheys): Nashville, Tennessee.

Holotype: Cat. No. 45730, U.S.N.M.

BUCANIA STIGMOSA Whiteaves. See *Bellerophon shelbiensis*.

***Bucania stigmosa* Hall.**

Bucania stigmosa Hall, Pal. New York, 2, 1852, p. 92, pl. 28, figs. 8a-e.

Lower Clinton: Lockport, New York.

***Bucania subangulata* Ulrich.**

Bucania subangulata Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 891, pl. 66, figs. 20-23.

Trenton (Flanagan): Mercer and Boyle Counties, Kentucky.

Cotypes.—Cat. No. 45731, U.S.N.M.

***Bucania sublata* Ulrich and Scofield.**

Bucania sublata Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 888, pl. 66, figs. 16-19.

Trenton: Near Burgin, Kentucky (Flanagan); Wykoff, Minnesota (Prosser).

Black River (Decorah): Near Fountain and Minneapolis, Minnesota.

Cotypes.—Cat. Nos. 45732, 45733, U.S.N.M.

***Bucania sulcatina* (Emmons).**

Bellerophon sulcatinus Emmons, Geol. Nat. Hist. New York, 2, 1842, p. 312, fig. 4.—Owen, Amer. Jour. Sci., 47, 1844, p. 358, fig. 4, p. 359.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 165, pl. 4, fig. 4; Manual Geol., 1860, p. 93, fig. 78 only.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 146, fig. 96a, b.

Bellerophon (*Bucania*) *sulcatinus* Salter, Quart. Jour. Geol. Soc. London, 1854, 10, p. 74.

Bucania sulcatina Hall, Pal. New York, 1, 1847, p. 32, pl. 6, figs. 10, 10a; pl. 33, fig. 4d.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 1, figs. 4, 5.—Waagen, Pal. Indica, 13th ser., pt. 2, 1880, p. 131.—Miller, N. A. Geol. Pal. 1889, p. 398, fig. 656.—Koken, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band 6, 1889, p. 379.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 97, figs.—Whiteaves, Canadian Rec. Sci., 5, 1893, p. 322 (loc. occ.).—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pp. 850, 883.—Koken, Neues Jahrb. f. Min., Geol. Pal., 1, 1898, p. 9.—Raymond, Ann. Carnegie Mus., 4, 1908, p. 194, pl. 49, figs. 15-17; pl. 50, figs. 3, 4; pl. 55, figs. 13, 14.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 613, figs. 820, 821.

Bucania rotundata Hall, Pal. New York, 1, 1847, p. 33, pl. 6, figs. 11a-c.

Bellerophon rotundatus Emmons, Amer. Geology, 1, pt. 2, 1855, p. 165.

Megalomphala? *rotundata* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 850 (gon. ref.).

Bucania champlainensis Whitfield, Bull. Amer. Mus. Nat. Hist., 9, 1897, p. 181, pl. 4, figs. 14-16.—Raymond, Bull. Amer. Pal., 3, 1902, p. 305, pl. 18, figs. 7, 8.

Chazy (Day Point-Valcour): Chazy, Plattsburgh, etc., New York; Vermont—East Tennessee; Isle La Motte, Vermont.

Middle Stones River: Chambersburg, Pennsylvania, etc.

Plesiotypes.—Cat. No. 53635, U.S.N.M.

BUCANIA TRIGONOSTOMA Whitfield. See *Tremanotus? trigonostoma*.

BUCANIA TRILOBATA Clarke. See *Bucanella trilobata*.

Bucania tripla Whitfield.

Bucania tripla Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 55, pl. 9, figs. 12, 13.—Seely, Rep. State Geol. Vermont, 7, 1910, pl. 60, fig. 7.

Canadian (Beekmantown): Providence Island, Lake Champlain.

BUCANIELLA Koken. See *Bucanella* Meek.

BUCANOPSIS Ulrich.

Genotype: *B. carinifera* Ulrich.

Bellerophon (part) of authors prior to 1884.

Bucania (part) Waagen, Pal. Indica, 13th ser., pt. 2, 1880, pp. 130 and 150.—Koken, N. Jahrb. f. Min., etc., Beilage Band, 6, 1889, p. 379.

Bucanopsis Ulrich, Geol. Minnesota, 3, pt. 2, 1897, pp. 853-922.—Grabau and Shimer, N. A. Index Fossils, 3, 1909, p. 622.

Bucanopsis carinifera Ulrich.

Bucanopsis carinifera Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 925, pl. 62, figs. 56-61.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 622, fig. 836.

Trenton (Flanagan): Near Danville, Kentucky; Maysville (Fairmount); Cincinnati, Ohio, and vicinity.

Cotypes.—Cat. No. 45734, U.S.N.M.

BUCANOSPIRA Ulrich.

Genotype: *B. expansa* Ulrich.

Bucanospira Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1044.

Bucanospira expansa Ulrich.

Bucanospira expansa Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1044, figs. 9a-c. Niagaran (Brownsport): Wayne County, Tennessee.

Cotypes.—Cat. No. 45735, U.S.N.M.

BUMASTUS Murchison.

Genotype: *B. barriensis* Murchison.

Bumastus Murchison, Sil. Syst., 1839, p. 656.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, pp. 540, 552.—Salter, Mem. Geol. Surv. United Kingdom, dec. 2, 1849, pls. 3, 4.—McCoy, Ann. Mag. Nat. Hist., 2d ser., 4, 1849, p. 399.—Salter, Mon. British Tril., Pal. Soc., 1867, p. 183.—Steinhardt, Beit. z. Naturk. Preuss. Phys.-Oekon. Gesell., Königsberg, 1874, p. 52.—Angelin, Pal. Scandinavica, 3d ed., Holmiae, 1878, p. 40.—Holm, Bihang K. Svenska Vet.-Hand., 7, 1882, pp. 12, 16.—Zittel, Handb. Pal., 2, Munich, 1885, p. 612.—Holm, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 33, 1886, pp. 18, 21, 42.—Koken, Die Leitfossilien, Leipzig, 1896, p. 28.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, pp. 26, 45.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 297.—Slocum, Field Mus. Nat. Hist., Geol. Ser. 4, 1913, p. 54.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 720.

Bumastus armatus (Hall).

Ilanus armatus Hall, adv. sheets, 18th Rep. New York State Cab. Nat. Hist., 1865, p. 26, figs. 3, 4; 20th Rep. 1867, p. 330, pl. 22, figs. 1-3, figs. 3-4; (rev. ed.), 1870, p. 418, figs. 8, 9, pl. 22, figs. 1-3, pl. 25, fig. 22; also p. 433; 28th Rep. New York State Mus. Nat. Hist. (doc. ed.), 1877, pl. 32, figs. 19-20; 1879, Mus. ed., p. 189, pl. 32, figs. 19, 20; 11th Rep. Dep. Geol. and Nat. Hist. Indiana, 1882, p. 335, pl. 34, figs. 19-20, pl. 33, fig. 12.—Kindle and Breger 28th Rep., ibid., 1904, p. 479, pl. 22, fig. 6.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 222, pl. 18, figs. 4-6.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 297, fig. 1609.

Bumastus armatus—Continued.

Illænus (*Bumastus*) *armatus* Salter, Mon. Brit. Tril., Pal. Soc., 1867, p. 209, fig. 54.

Illænus (*Bumastus*) *worthenanus* Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 105, 109.

Niagaran: Bridgeport, Illinois; Racine, etc., Wisconsin (Racine); Waldron, Indiana (Waldron); Georgetown and Wabash, Indiana.

BUMASTUS BARRIENSIS Hall. See *Bumastus ioxus*.

Bumastus beckeri Slocum.

Bumastus beckeri Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 54, pl. 14, figs. 1-4.

Richmond (Maquoketa): Clermont, Iowa.

Bumastus bellevillensis Raymond and Narraway.

Bumastus bellevillensis Raymond and Narraway, Ann. Carnegie Mus., 4, 1908, p. 253, pl. 61, figs. 6, 7.

Trenton: Belleville, Canada.

Bumastus billingsi Raymond and Narraway.

Cf. *Bumastus trentonensis* Emmons, Geol. New York, Rep. 2d Dist., 1842, p. 290, fig. 1.

Cf. *Illænus trentonensis* Hall, Pal. New York, 1, 1847, p. 230, pl. 60, fig. 5.

Cf. *Bumastus orbicaudatus* Clarke, Geol. Minnesota, 3, 1897, p. 722, fig. 36.

Bumastus billingsi Raymond and Narraway, Ann. Carnegie Mus., 4, 1908, p. 250, pl. 61, figs. 1, 2.—Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 34, pl. 3, fig. 12.

Trenton: Hull, Quebec, and vicinity.

Observation.—See Raymond and Narraway (1908) for a discussion of the synonyms of this species.

Bumastus chicagoensis (Weller).

Illænus chicagoensis Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 220, pl. 16, figs. 10-12.

Niagaran (Racine): Bridgeport, Illinois.

Bumastus cuniculus (Hall).

Illænus cuniculus Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 377, pl. 22, fig. 12; rev. ed., 1870, p. 421, pl. 22, fig. 12.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 219, pl. 19, figs. 1-6.

Niagaran (Racine): Hawthorne, Illinois; Wauwatosa, Wisconsin.

Bumastus elongatus Weller.

Bumastus elongatus Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 195, pl. 14, fig. 15.

Trenton: Near Springdale, New Jersey.

Bumastus erastusi (Raymond).

Illænus erastusi Raymond, Ann. Carnegie Mus., 3, 1905, p. 351, pl. 13, figs. 8, 9.

Bumastus erastusi Raymond, Ann. Carnegie Mus., 7, 1910, p. 71; 7th Rep. State Geol. Vermont, 1910, p. 229, pl. 35, figs. 8, 9.

Illænus crassicauda? Hall, Pal. New York, 1, 1847, p. 24, pl. 4 bis, fig. 13.

Chazyan: Valcour Island and Chazy, New York; Isle La Motte, Vermont (Crown Point, Valcour); Mingan Islands, Canada (Mingan).

Bumastus globosus (Billings).

Illænus globosus Billings, Canadian Nat. Geol., 4, 1859, p. 367, figs. 1-3; Geol. Canada, Geol. Surv. Canada, 1863, p. 133, figs. 64, a-c.—Miller, N. A. Geol. Pal., 1889, p. 551, text figs. 1015-16.—Raymond, Annals Carnegie Mus., 1905, p. 350, pl. 13, figs. 6, 7.—Grabau and Shimer, N. A. Index Fossils, 2,

1910, p. 294, figs. 1605, a. c.

Bumastus globosus—Continued.

Bumastus globosus Raymond, Ann. Carnegie Mus., 7, 1910, p. 71, pl. 19, fig. 9;
7th Rep. State Geol. Vermont, 1910, p. 228, pl. 35, figs. 6, 7; pl. 39, fig. 9;
Trans. and Proc. Roy. Soc. Canada, 3d ser., 5, sec. 4, 1912, p. 120, pl. 3, fig. 3.

Chazyan: Mingan Islands (Mingan); Island of Montreal; Chazy, Valcour Island,
Plattsburg, and Crown Point, New York; Isle La Motte, Vermont (Day
Point, Valcour); East Tennessee (Lenoir).

Bumastus graftonensis (Meek and Worthen).

Illænus (**Bumastus**) **griftonensis** Meek and Worthen, Proc. Acad. Nat. Sci.
Philadelphia, 1870, p. 54; Geol. Surv. Illinois, 7, 1875, p. 508, pl. 25, fig. 4.

Illænus graftonensis Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2,
1907, p. 223, pl. 16, figs. 4-6.—Keyes, Missouri Geol. Surv., 4, 1894, p. 226.

Niagaran: Grafton, Joliet, and near Lemont, Illinois (Racine).

Bumastus harrisi (Weller).

Illænus harrisi Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907,
p. 218, pl. 16, figs. 1-3.

Niagaran (Racine): Bridgeport, Illinois.

Bumastus imperator (Hall).

Illænus imperator Hall, Rep. Prog. Geol. Surv. Wisconsin, 1861, p. 49; Geol.
Surv. Wisconsin, 1, 1862, p. 433; adv. sheets 18th Rep. New York State
Cab. Nat. Hist., 1865, p. 28; 20th Rep., 1867, p. 332, pl. 22, figs. 15-17; pl.
23, figs. 2-3; rev. ed., 1870, p. 420, pl. 22, figs. 15-17; pl. 23, figs. 2-3.—Whit-
field, Geol. Wisconsin, 4, 1882, p. 306, pl. 21, figs. 4-5.—Weller, Bull. Chicago
Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 225, pl. 16, figs. 13-16.—Grabau
and Shimer, N. A. Index Fossils, 2, 1910, p. 297.

Niagaran (Racine): Racine, Waukesha and Burlington, Wisconsin; Joliet,
Illinois.

Bumastus indeterminatus (Walcott).

Illænus indeterminatus Walcott, 31st Rep. New York State Mus. Nat. Hist.,
1879 (1880); adv. sheets 1877, pp. 19, 70.

Illænus cf. indeterminatus Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 716, fig. 24.

Bumastus indeterminatus Raymond and Narraway, Ann. Carnegie Mus., 4, 1908,
p. 253, pl. 62, figs. 8, 9.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p.
297.

Black River: Russia, New York; Mechanicsville, Ontario; Tetreauville, Quebec
(Lowville); Platteville and Janesville, Wisconsin (Platteville).

Bumastus insignis (Hall).

Illænus insignis Hall, adv. sheets 18th Rep. New York State Cab. Nat. Hist.,
1865, p. 27, figs. 5, 6; 20th Rep., 1867, p. 331, figs. 5, 6; pl. 22, figs. 13, 14; rev.
ed., 1870, p. 419, figs. 10, 11; pl. 22, figs. 13, 14.—Whitfield, Geol. Wisconsin,
4, 1882, p. 305, pl. 21, figs. 6-10.—Chamberlin, Geol. Wisconsin, 1, 1883, p.
195, fig.—Foerste, 15th Ann. Rep. Geol. and Nat. Hist. Surv. Minnesota,
1887, p. 481.—Keyes, Missouri Geol. Surv., 4, 1894, p. 227, pl. 32, figs. 1 a-b.—
Geol. Surv. Ohio, 7, 1895, p. 525, pl. 26, fig. 11.—Kindle, 28th Ann. Rep.
Dep. Geol. Nat. Res. Indiana, 1904, p. 479, pl. 22, figs. 1-5.—Weller, Bull.
Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 215, pl. 17, figs. 1-5.—
Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 296, fig. 1608.

Illænus (**Bumastus**) **insignis** Salter, Mon. Brit. Tril., Pal. Soc., 1867, p. 207, pl.
27, figs. 6, 7.

Bumastus insignis Salter, Mon. Brit. Tril., Pal. Soc., 1867, p. 183 (gen. ref.).

Niagaran: Waukesha, Milwaukee, Racine, etc., Wisconsin; Bridgeport, Illinois
(Racine): Ohio and Indiana.

Bumastus ioxus (Hall).

Bumastus barriensis Hall (not Murchison), Geol. New York, pt. 4, 1843, p. 102, fig. 4; p. 101; tab. org. rem., 10, fig. 4, and 19, fig. 2.—Owen, Amer. Jour. Sci. and Arts, 48, 1845, p. 309, fig. 4.—Verneuil, Amer. Jour. Sci. and Arts, 2d ser., 7, 1849, p. 225.—Hall, Pal. New York, 2, 1852, p. 302, pl. 66, figs. 1-15.—Roemer, Sil. Fauna West Tennessee, Breslau, 1860, p. 83, pl. 5, fig. 23.—Emmons, Man. Geol., 1860, p. 108, fig. 98.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 319, fig. 338.—Miller, N. A. Geol. Pal., 1889, p. 536, fig. 981.

Illænus (Bumastus) barriensis? Hall, Geol. Surv. Wisconsin, 1, 1862, p. 433; adv. sheets, 18th Rep. New York State Cab. Nat. Hist., 1865, p. 28; 20th Rep. 1867, p. 332.

Illænus barriensis Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 8, fig. 5.—Hall, Trans. Albany Inst., 4, 1863, p. 227.

Illænus ioxus Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 387, fig.; pl. 22, figs. 4-11; pl. 23, fig. 1; rev. ed., 1870, p. 420, fig. 12, pl. 22, figs. 4-10.—Whitfield, Geol. Wisconsin, 4, 1882, p. 304, pl. 21, figs. 11, 12.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 195, fig.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 299, figs.—Foerste, Proc. Bost. Soc. Nat. Hist., 24, 1889, p. 268, pl. 5, fig. 20.—Van Ingen, School of Mines Quart., 23, 1901, p. 35.—Grabau, Bull. New York State Mus., 45, 1901, p. 223, fig. 154; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 223, fig. 154.—Kindle, 28th Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 480, pl. 22, fig. 7; pl. 23, fig. 3.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 222, pl. 18, figs. 1-3.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 295, figs. 1606, 1607.

Illænus (Bumastus) ioxus Hall, Trans. Albany Inst., 10, 1883, p. 76; 11th Rep. Dep. Geol. Nat. Hist. Indiana, 1882, p. 335, pl. 38, figs. 13, 14.

Niagaran: Rochester, Lockport, etc., New York; Hamilton, etc., Ontario (Rochester); Waldron, Indiana (Waldron); Racine, etc., Wisconsin; Illinois (Racine); Cedarville, etc., Wisconsin (Guelph); Indiana; Arkansas; Ohio; etc.

Bumastus limbatatus Raymond.

Bumastus limbatatus Raymond, Ann. Carnegie Mus., 7, 1910, p. 71; 7th Rep. Vermont State Geol., 1910, p. 230, pl. 35, figs. 1, 2.

Illænus indeterminatus Raymond (not Walcott) Ann. Carnegie Mus., 3, 1905, p. 347, pl. 13, figs. 1, 2.

Chazyan (Valcour): Valcour Island, New York, and Isle La Motte, Vermont.

Bumastus milleri (Billings).

Cf. *Illænus trentonensis* Emmons, Geol. New York, Rep. 2d Dist., 1842, p. 390, fig. 3.

Cf. *Bumastus trentonensis* Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 718, figs. 30-35.—Weller, Pal. New Jersey, 3, 1902, p. 194, pl. 14, figs. 8-13.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 298, figs. 1610a, b.

Illænus milleri Billings, Canadian Nat. Geol., 4, 1859, p. 375, fig. 10; Geol. Canada, Geol. Surv. Canada, 1863, p. 151, fig. 112.—Walcott, 31st Ann. Rep. New York State Mus. Nat. Hist., 1879, p. 71 (adv. sheets, 1877, p. 20).—Raymond and Narraway, Ann. Carnegie Mus., 4, 1908, p. 249, pl. 61, figs. 9, 10; pl. 62, figs. 3-5.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 297.

Black River: Ottawa, etc., Ontario; New York; New Jersey; etc.

Observation.—See Raymond and Narraway (1908) for a discussion of this and related species.

Bumastus niagarensis (Whitfield).

Illænus niagarensis Whitfield, Ann. Rep. Wisconsin Geol. Surv., 1880, p. 68.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 219, pl. 19, figs. 7-11.

Bumastus niagarensis—Continued.

- Bumastus niagarensis* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 298.
Illænus madisonianus Whitfield, Geol. Wisconsin, 4, 1882, p. 307, pl. 20, figs. 8, 9.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 195, fig.—Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 106, pl. 14, figs. 1a, 1b, 2a-2b; 2, 1887, p. 93, pl. 8, figs. 8-10; Geol. Surv. Ohio, Pal., 7, 1893, p. 526, pl. 27, figs. 7-10.—Van Ingen, School of Mines Quart., 23, 1901, p. 35.
Illænus madisonianus vars. *elongatus* and *depressus* Foerste, Geol. Surv. Ohio, 7, 1893, p. 526, pl. 26, figs. 1, 2; pl. 27, figs. 7-10.
 Niagara: Wisconsin and Illinois (Racine); St. Clair Springs, Arkansas (St. Clair); Dayton, Ohio (Brassfield).

Bumastus orbicaudatus (Billings).

- Illænus orbicauda* Billings, Canadian Nat., 4, 1859, p. 379.
Illænus orbicaudatus Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 27, fig. 10; p. 60.—Salter, Mon. Brit. Tril., Pal. Soc., 1867, p. 209.
 Richmond-Anticostian (English Head, Gun River): English Head, Gamache Bay, etc., Anticosti.

BUMASTUS ORBICAUDATUS Clarke. See *Bumastus billingsi*.**Bumastus transversalis** Weller.

- Bumastus transversalis* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 195, pl. 14, fig. 14.
 Trenton: Hainesburg, New Jersey.

Bumastus trentonensis Emmons.

- Bumastus trentonensis* Emmons, Nat. Hist. New York, Geol., 2, 1842, p. 390, fig. 1.
Illænus trentonensis Hall, Pal. New York, 1, 1847, p. 230, pl. 69, fig. 5.
 Trenton (drift): Hogsburg, New York.
 Observation.—Type lost and figures not sufficient for accurate identification. See Raymond and Narraway (Annals Carnegie Mus., 4, 1908, p. 251) for a discussion of this and related forms.

BUTHOGRAPTUS Hall.Genotype: *B. latus* Hall.

- Buthograptus* Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 18; 20th Rep. New York State Cab. Hist., 1868, p. 218; rev. ed., 1870, p. 252.—Nicholson, Mon. Brit. Grapt., 1872, p. 131.—Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 563.—Whitfield, Bull. Amer. Mus. Nat. Hist., 6, 1894, p. 351 (*Bythocladus*, new name, suggested).
Bythograptus Miller, N. A. Geol. Pal., 1889, p. 174.

Buthograptus latus Hall.

- Buthograptus latus* Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 19; Geol. Surv. Canada, dec. 2, 1865, p. 18, fig. 25; 20th Rep. New York State Cab. Nat. Hist., 1868, p. 185, fig. 27; rev. ed., 1870, p. 214, fig. 27.—Nicholson, Mon. Brit. Graptol., 1872, p. 132, fig. 72.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 153, fig.—Whitfield, Bull. Amer. Mus. Nat. Hist., 6, 1894, p. 351, pl. 11, figs. 1-3; Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 40, pl. 4, figs. 1-3.
 Black River (Platteville): Platteville, etc., Wisconsin.

BUTHOTREPHIS Hall.Genotype: *B. antiquata* Hall.

- Buthotrephis* Hall, Pal. New York, 1, 1847, p. 8.—Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 99.—Nathorst, Ofvers K. Vet.-Akad. Forhandl., 30, No. 9, 1873, p. 46.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 159.
Bythotrephis Roemer, Leth. geog., 1, Theil, Leth. Pal., Erste Leif, 1880, p. 123.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 139.—Grabau, Bull. New York State Mus., 45, 1901, p. 130; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 130.—Miller, N. A. Geol. Pal., 1889, p. 109.

Buthotrephis antiquata Hall.

Buthotrephis antiquata Hall, Pal. New York, 1, 1847, p. 8, pl. 2, fig. 6.—Goeppert, Nov. Act. Acad. Caes. Leop. Car., 22, Suppl. (Uebergangsggeb.), 1852, p. 85.—Quenstedt, Handb. Petrefaktenk. Tübingen, 3d ed., 1885, p. 1081, fig. 402.—Lesley, Rep. Geol. Surv. Pennsylvania, P 4, 1889, p. 98, fig.
Chazyan: Chazy, New York.

Buthotrephis? caespitosa Hall.

Buthotrephis? caespitosa Hall, 3d Rep. New York State Cab. Nat. Hist., rev. ed., 1850, p. 178, pl. 1, fig. 1a-c (doc. ed., p. 170).
Trenton: Near Watertown, New York.

Buthotrephis clavelloides (Grabau).

Bythotrephis clavelloides Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 210, pl. 12, fig. 1.
Cayugan (Akron): North Buffalo, New York.

Buthotrephis divaricata White.

Buthotrephis divaricata David White, Proc. U. S. Nat. Mus., 24, 1902, p. 265, pl. 16.
Cayugan (Kokomo): Kokomo, Indiana.

BUTHOTREPHIS FILICIFORMIS James. See *Chlœphyucus filiciformis*.

BUTHOTREPHIS GRACILIS Hall (1847). See *Buthotrephis tenuis*.

Buthotrephis gracilis (Hall).

Fucoides gracilis Hall, Nat. Hist. New York, Geol., 4, 1843, p. 69, fig.
Buthotrephis gracilis Hall (not Hall, 1847), Pal. New York, 2, 1852, p. 18, pl. 5, figs. 1a-d.—Rogers, Geol. Pennsylvania, 2, 1858, p. 822, fig. 625.—Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 137.—Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 574.—Lesquereux, 13th Ann. Rep. Indiana Geol. Surv., 1883, p. 30, pl. 1, figs. 1, 6, 7.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 160, pl. 9, fig. 6.—Lesley, Rep. Geol. Surv. Pennsylvania, P. 4, 1889, pp. 99, 100, figs.
Bythotrephis gracilis Schimper, Pal. Veg., 1, 1869, p. 198.—Grabau, Bull. New York State Mus., 45, 1901, pp. 130, 131, fig. 25; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 130, 131, fig. 25.
Buthotrephis Hallii Humphreys, Bull. Torrey Botanical Club, 37, 1910, p. 309.
Lithodendron dichotomum Eaton, Geol. Textb., 2d ed., 1882, p. 39, pl. 4, fig. 43.—Clarke, 11th Rep. State Geol. New York, 1894, p. 34.—45th Rep. New York State Mus., 1894, p. 350.
Clinton: New Hartford, New York. This species has been identified in the Silurian at numerous American localities.

Buthotrephis gracilis crassa Hall.

Buthotrephis gracilis var. *crassa* Hall, Pal. New York, 2, 1852, p. 19, pl. 5, fig. 3a-d; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 221, pl. 1, fig. 6.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 101, fig.
Dendrograptus gracilis var. *crassa* James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 159.
Silurian: Oneida County, etc., New York (Clinton); Waldron, Indiana (Waldron); Ontario (Cataract), etc.

Buthotrephis gracilis intermedia Hall.

Buthotrephis gracilis var. *intermedia* Hall, Pal. New York, 2, 1852, p. 19, pl. 5, fig. 2a, b.

Buthotrephis gracilis intermedia—Continued.

Dendrograptus gracillimum var. *intermedia* James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 161.

Early Silurian: New Hartford, New York (Clinton); Ontario (Cataract), etc.

BUTHOTREPHIS GRANTI Dawson. See *Inocaulis grantii*.

Buthotrephis gregaria Ringueberg.

Buthotrephis gregaria Ringueberg, Proc. Acad. Nat. Sci. Philadelphia, 1888, p. 131, pl. 7; fig. 1.

Clinton (Rochester): Lockport, New York.

BUTHOTREPHIS HALLII Humphreys. See *Buthotrephis gracilis*.

Buthotrephis impudica Hall.

Buthotrephis impudica Hall, Pal. New York, 2, 1852, p. 20, pl. 6, fig. 2.

Clinton: New Hartford, New York.

Buthotrephis lesquereuxi Grote and Pitt.

Buthotrephis Lesquereuxi Grote and Pitt, Bull. Buffalo Soc. Nat. Sci., 3, 1876, p. 88.—Pohlman, *ibid.*, 4, 1881, p. 19, fig. 6.

Bythotrephis lesquereuxi Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 131, fig. 26; Bull. New York State Mus., 45, 1901, p. 131, fig. 26.

Cayugan (Akron): Buffalo, New York.

Buthotrephis newlini White.

Buthotrephis newlini David White, Proc. U. S. Nat. Mus., 24, 1902, p. 266, pls. 17, 18.

Cayugan (Kokomo): Kokomo, Indiana.

Buthotrephis palmata Hall.

Buthotrephis palmata Hall, Pal. New York, 2, 1852, p. 20, pl. 6, fig. 1; pl. 7, fig. 1a, b.

Clinton: New Hartford, New York.

Buthotrephis pergracilis Dawson.

Buthotrephis pergracilis Dawson, Canadian Rec. Sci., 3, 1888, p. 55.—Dawson. Trans. Royal Soc. Canada, 7, sec. 4, 1890, p. 54, fig. 27; 2d ser., 2, sec. 4, 1896, p. 120, fig. 32.

Canadian? (Levis?): Little Metis, Quebec.

Buthotrephis ramosa Hall.

Buthotrephis ramosa Hall, Pal. New York, 2, 1852, p. 21, pl. 6, fig. 3.

Clinton: New Hartford, New York.

Buthotrephis ramulosa Miller.

Buthotrephis ramulosus Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 235, fig. 29.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 159.

Bythotrephis ramulosus Miller, N. A. Geol. Pal., 1889, p. 109, fig. 19.

Trenton (upper) or Eden (Fulton): Cincinnati, Ohio, and vicinity.

Buthotrephis subnodosa Hall.

Buthotrephis subnodosa Hall, Pal. New York, 1, 1847, p. 262, pl. 68, figs. 3a, b.—Goepfert, Nov. Act. Acad. Caes. Leop. Car., 22, Suppl. (Uebergangsgeb.), 1852, p. 86.

Utica-Pulaski: Turin, Loraine, and Pulaski, New York.

Buthotrephis succulens Hall.

Buthotrephis succulens Hall, Pal. New York, 1, 1847, p. 62, pl. 22, figs. 2a, b.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 152, fig. 25.

Buthotrephis succulosa James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 159.

Bythotrephis succulens Miller, N. A. Geol. Pal., 1889, p. 110.

Licrophycus succulens Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 937 (gen. ref.).

Trenton: Glens Falls, New York.

BUTHOTREPHIS SUCCULOSA James. See *Buthotrephis succulens*.

Buthotrephis tenuis (Hall).

Buthotrephis gracilis Hall, Pal. New York, 1, 1847, p. 62, pl. 21, fig. 1.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 7, fig. 1.—Etheridge, Quart. Jour. Geol. Soc. London, 39, 1878, p. 574.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 152, fig. 26b.

Buthotrephis conf. *gracilis* Emerson, Narrative Hall's Second Arctic Exped., U. S. Navy Dep., 1879, p. 575, fig. 1.

Buthotrephis tenuis Hall, Pal. New York, 2, 1852, p. 18.

Bythotrephis tenuis Chapman, Proc. Royal Soc. Victoria, 15, new ser., 1903, p. 104, pl. 16, fig. 1.

Trenton: Jacksonburgh and Middleville, Herkimer County, New York.

Buthotrephis yukonensis Ami.

Bythotrephis yukonensis Ami., Canadian Geol. Surv., Summ. Rep. for 1904, 1905, p. 388.

Lower Paleozoic?: Seven miles north Dalton's Post, Unihana River, Yukon district, Canada.

BYSSONYCHIA Ulrich.

Genotype: *Ambonychia radiata* Hall.

Ambonychia (part) Hall, Pal. New York, 1, 1847, p. 163; 3, 1859, pp. 269 and 523; also of many American and European authors.

Byssonychia, Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 498; Geol. Surv. Ohio, 7, 1893, p. 629.—Cumings, 32d Ann. Rep. Dep. Geol. and Nat. Res. Indiana, 1908, p. 979.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 431.—Dall, Zittel-Eastman Textb. Pal., 1900, p. 368; 2d. ed., 1913, p. 445.

Byssonychia acutirostris Ulrich.

Byssonychia acutirostris Ulrich, Geol. Surv. Ohio, 7, 1893, p. 634, pl. 45, figs. 8, 9; pl. 46, fig. 10.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

Holotype.—Cat. No. 46095 U.S.N.M.

Byssonychia alveolata Ulrich.

Byssonychia alveolata, Ulrich, Geol. Surv. Ohio, 7, 1893, p. 631, pl. 48, figs. 1-3.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 989, pl. 42, figs. 7, 7a.

Maysville (Corryville): Cincinnati, Ohio; southeastern Indiana.

Holotype.—Cat. No. 46096, U.S.N.M.

Byssonychia(?) byrnesi Ulrich.

Byssonychia(?) byrnesi Ulrich, Geol. Surv. Ohio, 7, 1893, p. 635, pl. 47, figs. 4 and 5.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 431, fig. 563.—

Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 134, pl. 3, fig. 6.

Trenton (Upper): Covington, Rogers Gap, etc., Kentucky; Tennessee.

Cotypes.—Cat. No. 46097, U.S.N.M.

Byssonychia carinata (Goldfuss).

Pterinea carinata Goldfuss, Petref. Germ., 1826, p. 136, pl. 119, fig. 8.—Vanuxem, Nat. Hist. New York, Geol., 3, 1842, p. 64, p. 65, fig. 1.—Emmons, *ibid.*, Geol., 2, 1842, p. 402, fig. 1.—Owen, Amer. Jour. Sci. and Arts, 47, 1844, p. 376, fig. 1.

Avicula carinata Emmons, Amer. Geology, 1, pt. 2, 1855, p. 175, pl. 17, fig. 23.

Ambonychia carinata Hall, Pal. New York, 1, 1847, p. 294, pl. 80, figs. 5a, b; Geol. Lake Sup. Land Dist., Foster and Whitney's Rep., 1851, p. 215, pl. 31, fig. 3; Pal. New York, 3, 1861, p. 269.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 22, fig.

Byssonychia carinata Foerste, Bull. Sci. Lab. Denison Univ. 17, 1914, p. 324. Cincinnati (Pulaski): Lewistown, Oneida County, New York.

Byssonychia cultrata Ulrich.

Byssonychia cultrata, Ulrich, Geol. Surv. Ohio, 7, 1893, p. 632, pl. 45, figs. 5-7. Richmond (Waynesville): Waynesville, Ohio; Versailles, Indiana.
Cotypes.—Cat. Nos. 46098, 46596, U.S.N.M.

Byssonychia grandis Ulrich.

Byssonychia grandis Ulrich, Geol. Surv. Ohio, 7, 1893, p. 631, pl. 46, figs. 6-9.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 990, pl. 44, figs. 1, 1a.
Richmond (Waynesville-Whitewater): Oxford, Clarksville, etc., Ohio; Indiana.
Cotypes.—Cat. Nos. 46099, 46100, U.S.N.M.

Byssonychia imbricata Ulrich.

Byssonychia imbricata Ulrich, Geol. Surv. Ohio, 7, 1893, p. 635, pl. 46, figs. 4 and 5.
Maysville (Corryville): Cincinnati, Ohio.
Holotype.—Cat. No. 46101, U.S.N.M.

Byssonychia intermedia (Meek and Worthen).

Ambonychia intermedia Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 306, pl. 2, fig. 5a, b.
Byssonychia intermedia Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 499, pl. 35, figs. 23-26.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 182.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 431, fig. 562a, b.
Trenton: Mount Carroll, Illinois; Oshkosh, Wisconsin; Wykoff, Minnesota; Lake Winnepeg, Canada; Kentucky.
Plesiotype.—Cat. No. 46102, U.S.N.M.

Byssonychia obesa Ulrich.

Byssonychia obesa Ulrich, Geol. Surv. Ohio, 7, 1893, p. 630, pl. 45, figs. 10-12.—Whiteaves, Pal. Foss., 2, Geol. Surv. Canada, 3, 1895, pt. 2, p. 122 (loc. occ.).—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 991, pl. 42, figs. 8, 8b.
Ambonychia obesa Miller, N. A. Geol. Pal., 1897, 2d App., p. 779 (gen. ref.).
Richmond: Richmond, Indiana (Whitewater); Stony Mountain, Manitoba.
Holotype.—Cat. No. 46103, U.S.N.M.

Byssonychia præcura Ulrich.

Byssonychia præcura Ulrich, Geol. Surv. Ohio, 7, 1893, p. 633, pl. 45, figs. 1, 2.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 992, pl. 43, figs. 3, 3a.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 432, fig. 565.
Maysville: Lorraine, New York (Pulaski); Covington, Kentucky, and vicinity (Fairmount).
Cotype.—Cat. No. 46104, U.S.N.M.

***Byssonychia radiata* (Hall).**

Ambonychia radiata Hall, Pat. New York, 1, 1847, p. 292, pl. 80, figs. 4a-1.—Billings, Canadian Nar. Geol., 1, 1856, p. 44, fig. 7.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 8, fig.; p. 110, figs. 1, 2.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 4, fig. 7.—Hall, Pal. New York, 3, 1861, p. 269, fig.; p. 523, figs. 1, 2.—Chapman, Canadian Jour., n. s., 7, 1862, p. 166, fig. 110; *ibid.*, 8, 1863, p. 206, fig. 206.—Hall, Rep. Geol. Surv. Wisconsin, 1862, p. 54, figs. 1, 2.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 215, fig. 219.—Chapman, Expos. Min. Geol. Canada, 1864, p. 120, fig. 110; p. 178, fig. 205.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, pp. 14, 15.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 35, fig. 11.—Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 79, pl. 2, fig. 2.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 4, fig. 17.—Zittel, Handb. Pal., 2, 1881, p. 35, fig. 42b.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 174, fig.—Miller, N. A. Geol. Pal., 1889, p. 461, fig. 771.—Lesley, Geol. Pennsylvania, Rep. P 4, 1889, p. 23, figs.

Byssonychia radiata Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 477, fig. 35VI.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1906, p. 993, pl. 43, fig. 4.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 432, fig. 562c, 566.—Baesler, Bull. Geol. Surv. Virginia, 2a, 1909, pl. 14, fig. 7.—Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 273, pl. 3, figs. 12a-c.

Maysville-Richmond: Turin, Lorraine, Pulaski, etc., New York, and Quebec (Pulaski); Ohio; Indiana; Kentucky; Virginia; Tennessee (Maysville and Richmond); Anticosti, etc., Canada.

Plesiotype.—Cat. No. 46105, U.S.N.M. (Ulrich).

***Byssonychia retrorsa* (Miller).**

Ambonychia retrorsa Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 104, pl. 3, fig. 6.

Byssonychia retrorsa Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 499 (gen. ref.). Maysville (Fairmount): Cincinnati, Ohio.

***Byssonychia richmondensis* Ulrich.**

Ambonychia robusta Miller (part), Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 315.

Byssonychia richmondensis Ulrich, Geol. Surv. Ohio, 7, 1893, p. 632, pl. 45, figs. 3, 4.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1906, p. 994, pl. 44, figs. 2-2a.

Richmond (Whitewater): Richmond, etc., Indiana.

Holotype.—Cat. No. 46106, U.S.N.M.

***Byssonychia robusta* (Miller).**

Ambonychia robusta Miller, Jour. Cincinnati Soc. Nat. Hist., 3, 1881, p. 315, pl. 8, figs. 3, 3a.

Byssonychia robusta Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 499 (gen. ref.). Richmond (Whitewater): Osgood, Indiana.

***Byssonychia suberecta* Ulrich.**

Byssonychia suberecta Ulrich, Geol. Surv. Ohio, 7, 1893, p. 634, pl. 45, figs. 13-15.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1906, p. 995, pl. 44, figs. 3-3b.

Richmond (Waynesville): Waynesville, Ohio; Versailles, Indiana.

Cotypes.—Cat. No. 46107, U.S.N.M.

***Byssonychia tenuistriata* Ulrich.**

Byssonychia tenuistriata Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 500, fig. 39.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1906, p. 996, pl. 43, figs. 5, 5a.

Byssonychia tenuistriata—Continued.

Ambonychia tenuistriata Miller, N. A. Geol. Pal., 2d App., 1897, p. 779 (gen. ref.).
Richmond: Granger and Spring Valley, Minnesota (Maquoketa); Richmond,
Indiana (Whitewater).

Byssonychia vera Ulrich.

Byssonychia vera Ulrich, Geol. Surv. Ohio, 7, 1893, p. 629, figs. a-c.—Foerste,
Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 134, pl. 1, fig. 15.

Ambonychia bellistriata, Miller (not Hall, 1847), Cincinnati Quart. Jour. Sci., 1,
1874, p. 14.

Byssonychia radiata (Hall) new var., Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p.
479, fig. 36V.

Ambonychia cincinnatiensis Miller and Faber, Jour. Cincinnati Soc. Nat. Hist.,
17, 1894, p. 24, pl. 1, figs. 8-10.

Eden: Cincinnati, Ohio, and vicinity.

Trenton (Upper): Rogers Gap, etc., Kentucky.

Cotypes.—Cat. No. 46106, U.S.N.M.

Byssonychia walkerensis Grabau.

Byssonychia walkerensis Grabau, Bull. Geol. Soc. Amer., 24, 1913, p. 454.

Maysville (Bays): Big Walker Mountain, Virginia.

BRYOCLADUS Whitfield. See *Buthograptus* Hall.**BYTHOCYPRIS** Brady.

Genotype: *B. reniformis* Brady.

Bythocypris Brady, "Challenger" Exped. Rept. Ostracoda, 1880, p. 45.—Jones
and Kirkby, Ann. Mag. Nat. Hist., 5th ser., 18, 1886, p. 250; Proc. Geol. Assoc.,
9, 1897, p. 510.—Jones, Ann. Mag. Nat. Hist., 5th. ser., 19, 1887, p. 184.—
Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 196.—Miller, N. A.
Geol. Pal., 1st App., 1892, p. 706.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894,
p. 686; Zittel-Eastman Textb. Pal., 1, 1900, p. 646.—Grabau and Shimer,
N. A. Index Fossils, 2, 1910, p. 365.—Bassler, Zittel-Eastman Textb. Pal.,
2d ed., 1913, p. 740.

Bythocypris(?) curta Ulrich.

Bythocypris (?) *curta* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 689, pl. 44, figs.
36-38.

Black River (Decorah): St. Paul, Minnesota.

Holotype.—Cat. No. 41794, U.S.N.M.

Bythocypris cylindrica (Hall).

Leperditia (Isochilina) *cylindrica* Hall, 24th Rep. New York State Cab. Nat.
Hist., 1872, p. 231, pl. 8, fig. 12 (Extract, 1871, p. 7, pl. 4, fig. 12).—Hall and
Whitfield, Geol. Surv. Ohio, Pal. 2, 1875, p. 101, pl. 4, fig. 5.

Leperditia cylindrica Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 122; 2,
1875, p. 351.

Bythocypris cylindrica Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 687, pl. 44,
figs. 29-35, p. 688.—Ulrich, Geol. Surv. Canada, Cont. Micro-Pal., pt. 2,
1889, p. 48, pl. 9, fig. 6.—Ruedemann, Bull. New York State Mus., 49, 1901,
p. 86, pl. 7, figs. 26, 28.

Bythocypris (Cytherellina?) *cylindrica* Grabau and Shimer, N. A. Index Fos-
sils, 2, 1910, p. 365, fig. 1666.

Primitia minuta Jones (part), Quart. Jour. Geol. Soc. London, 46, 1890, p. 7, pl.
3, figs. 18, 19 (not figs. 21-23).

Trenton to Richmond: Cincinnati, Ohio, and vicinity; Indiana; Kentucky;
Tennessee; Minnesota; New York; Ontario, Manitoba; etc.

Pleniotypes.—Cat. Nos. 41795, 41796, U.S.N.M.

Bythocypris granti Ulrich.

Bythocypris granti Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 689, pl. 44, figs. 39-42.

Black River (Decorah): St. Paul and Minneapolis, Minnesota.

Cotypes.—Cat. No. 41793, U.S.N.M.

Bythocypris? lindstroemii Jones.

Bythocypris? lindstroemii Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 548, pl. 21, figs. 11a-c.

Richmond (English Head and Charleton): South of Junction Cliff, Anticosti.

Bythocypris nearpassi Weller.

Bythocypris nearpassi Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 257, pl. 23, fig. 12.

Helderbergian (Decker Ferry): Two miles south Tri-States, New York.

Bythocypris? obtusa Jones.

Bythocypris? obtusa Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 549, pl. 21, figs. 4a, b.

Richmond (English Head and Charleton): English Head, etc., Anticosti.

Bythocypris punctulata arctata Ulrich and Bassler.

Bythocypris punctulata var. *arctata* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 540, pl. 98, fig. 22.

Helderbergian (Keyser): Cumberland, Maryland; Keyser, West Virginia.

Holotype.—Cat. No. 53290 U.S.N.M.

Bythocypris punctulata niagarensis Ulrich.

Bythocypris punctulata niagarensis Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 196.

Clinton (Rochester): Lockport, New York.

Holotype.—Cat. No. 41797, U.S.N.M.

Bythocypris(?) robusta Ulrich.

Bythocypris(?) robusta Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 690, figs. 52a-d.

Bythocypris(?) (Cytherellina?) robusta Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 365, fig. 1667, 1, 1', m, n.

Black River (Platteville): Dixon, Illinois.

Holotype.—Cat. No. 41728, U.S.N.M.

BYTHOPORA Miller and Dyer.

Genotype: *B. fruticosa* Miller and Dyer=*Helopora dendrina* James.

Bythopora Miller and Dyer, Contr. Pal., No. 2, 1878, p. 6.—Miller, N. A. Geol.

Pal., 1889, p. 295.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 376; Geol. Minne-

sota, 3, 1893, p. 263; Zittel's Textb. Pal. (Eng. ed.), 1896, p. 277.—Simpson,

14th Ann. Rep. State Geol. New York for 1894, 1897, p. 551.—Nickles

and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 32.—Grabau, Bull.

Buffalo Soc. Nat. Sci., 7, 1901, p. 166; Bull. New York State Mus., 45, 1901,

p. 166.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 29.—Grabau and

Shimer, N. A. Index Fossils, 1, 1907, p. 133.—Cumings, 32d Ann. Rep. Dep.

Geol. Nat. Res. Indiana, 1908, p. 741.—Hennig, Archiv fur Zool., 4, No.

10, 1908, p. 44.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 240; Zittel-

Eastman Textb. Pal., 1913, p. 335.

Bythopora alcornis Ulrich.

Bythopora alcornis Ulrich, Geol. Minnesota, 3, 1893, p. 264, pl. 26, figs. 7-9.—

Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 551, fig. 121.

Black River (Decorah): Near Cannon Falls, Minnesota.

Cotypes.—Cat. No. 43514, U.S.N.M.

Bythopora arctipora (Nicholson).

Ptilodictya? *arctipora* Nicholson, *Ann. Mag. Nat. Hist.*, 4th ser., 15, 1875, p. 180, pl. 14, figs. 4-4b; *Pal. Ohio*, 2, 1875, p. 262, pl. 25, figs. 9-9b.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P. 4, 1889, p. 825, figs.

Bythopora arctipora Miller and Dyer, *Contr. to Pal.*, No. 2, 1878, p. 6.—Bassler, *Proc. U. S. Nat. Mus.*, 30, 1906, p. 19, pl. 2, figs. 1, 2.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 780, pl. 8, fig. 8; pl. 26, fig. 15, 15a.

Chaetetes minutus James, *Paleontologist*, 3, 1879, p. 20 (see James and James, *Jour. Cincinnati Soc. Nat. Hist.*, 10, p. 173).

Eden: Cincinnati, Ohio, and vicinity.

Bythopora delicatula (Nicholson).

Chaetetes delicatulus Nicholson, *Quart. Jour. Geol. Soc. London*, 30, 1874, p. 505, pl. 29, figs. 8-8b; *Pal. Ohio*, 2, 1875, p. 199, pl. 21, figs. 9, 9a; *Pal. Province Ontario*, 1875, p. 30.

Monticulipora delicatula James and James, *Jour. Cincinnati Soc. Nat. Hist.*, 10, 1888, p. 173.—Miller, *N. A. Geol. Pal.*, 1889, p. 197, fig. 196.

Bythopora? *delicatula* Ulrich, *Contr. Micro-Pal., Cambro-Sil.*, pt. 2, 1889, p. 36.—Whiteaves, *Pal. Foss.*, 3, 1895, p. 116.—Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 184.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 781, pl. 8, fig. 7; pl. 27, fig. 1.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 133.

Richmond: Oxford, Waynesville, etc., Ohio; Richmond and other localities in Indiana; Weston and Toronto, Ontario; Stony Mountain, Manitoba.

Bythopora dendrina (James).

Helopora dendrina James, *Paleontologist*, No. 1, 1878, p. 3; No. 2, p. 14.

Bythopora dendrina Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 185.—Bassler, *Proc. U. S. Nat. Mus.*, 30, 1906, p. 20.

Bythopora fruticosa Miller and Dyer, *Contr. Pal.*, No. 2, 1878, p. 6, pl. 4, figs. 6, 6a.—Miller, *N. A. Geol. Pal.*, 1889, p. 295, fig. 461.

Maysville (Fairmount) Cincinnati, Ohio, and vicinity.

BYTHOPORA FRUTICOSA Miller and Dyer. See *Bythopora dendrina*.

Bythopora gracilis (Nicholson).

Chaetetes gracilis James, *Cat. Low. Sil. Foss. Cincinnati Group*, 1871, p. 3.—Nicholson, *Quart. Jour. Geol. Soc. London*, 30, 1874, p. 504, pl. 29, figs. 7, 7a; *Pal. Ohio*, 2, 1875, p. 198, pl. 21, figs. 8, 8b; *Pal. Province Ontario*, 1875, p. 11; *Ann. Mag. Nat. Hist.*, 4th ser., 28, 1876, p. 90, pl. 5, fig. 13.

Monticulipora (*Heterotrypa*) *gracilis* Nicholson, *Genus Monticulipora*, 1881, p. 125, pl. 2, figs. 1-1b, 20.

Monticulipora gracilis Hall, 12th Ann. Rep. Indiana Geol. Nat. Hist., 1883, p. 248, pl. 10, figs. 1-3; pl. 11, fig. 11.—James and James, *Jour. Cincinnati Soc. Nat. Hist.*, 10, 1888, p. 173.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P. 4, 1889, p. 420, figs.—James, *Jour. Cincinnati Soc. Nat. Hist.*, 1894, 16, p. 191.

Batostomella gracilis Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 141; 6, 1883, p. 83; 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 103; *Contr. Micro-Pal., Cambro-Sil.*, pt. 2, 1889, p. 35.—Miller, *N. A. Geol. Pal.*, 1889, p. 294, fig. 458.—Ulrich, *Geol. Surv. Illinois*, 8, 1890, p. 432, pl. 35, fig. 2.

Homotrypella gracilis Ulrich, *Geol. Minnesota*, 3, 1893, p. 228.—Whiteaves, *Pal. Foss.*, 3, 1895, p. 115.

Bythopora gracilis Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 185.—Bassler, *Proc. U. S. Nat. Mus.*, 30, 1906, p. 20.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 782, pl. 8, figs. 6, 6b; pl. 27, figs. 2, 2a.

Bythopora gracilis—Continued.

Chaetetes laeviramus Quenstedt, *Röhren- und Sternkorallen*, 1881, p. 81, pl. 146, fig. 2b.

Maysville: Cincinnati, Ohio, and vicinity; Kentucky; Indiana; Tennessee.

Plesiotypes.—Cat. No. 43408, U.S.N.M. (Ulrich).

Bythopora herricki (Ulrich).

Bythopora herricki Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 99; Geol. Minnesota, 3, 1893, p. 263, pl. 26, figs. 1-6.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 551, fig. 120.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 133, fig. 188e, 190e.

Black River (Decorah): St. Paul, Minnesota, and vicinity.

Cotypes.—Cat. No. 43513, U. S. N. M.

Bythopora meeki (James).

Chaetetes meeki James, Paleontologist, No. 1, 1878, p. 1.

Monticulipora (*Chaetetes*) *meeki* James, Paleontologist, No. 5, 1881, p. 35.

Monticulipora gracilis var. *meeki* Nicholson, Genus *Monticulipora*, 1881, p. 127.

Monticulipora meeki James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 174.—J. F. James, *ibid.*, 16, 1894, p. 192.

Homotrypella meeki Ulrich, Geol. Minnesota, 3, 1893, p. 228.

Bythopora meeki Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 185.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 21.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 783, pl. 8, figs. 5, 5a; pl. 27, fig. 5.

Richmond: Waynesville and other localities in Ohio, Richmond, etc., Indiana; Kentucky.

BYTHOPORA NASHVILLENSIS Miller. See *Rhinidictya nashvillensis*.

Bythopora parvula (James).

Helopora parvula James, Paleontologist, No. 1, 1878, p. 3.

Bythopora parvula Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 186.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 22, pl. 3, figs. 11, 12; pl. 5, fig. 4.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 783, pl. 27, fig. 3.

Eden (McMicken): Obanon Creek, Clermont County, Cincinnati, etc., Ohio; Indiana; Kentucky.

Bythopora spinulosa (Hall).

Trematopora spinulosa Hall, Pal. New York, 2, 1852, p. 155, pl. 40A, figs. 11a-c.

Bythopora spinulosa Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 180.—Grabau, Bull. New York State Mus., 45, 1901, p. 166, fig. 64; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 166, fig. 64.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 29, pl. 13, figs. 6, 7; pl. 24, figs. 12, 13.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 134, fig. 189.

Clinton (Rochester): Lockport, Rochester, etc., New York; Thorold, Hamilton, and Grimsby, Ontario.

Plesiotypes.—Cat. No. 35516, U.S.N.M.

Bythopora striata Ulrich.

Bythopora striata Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 36.—Whiteaves, Pal. Foss., 3, 1895, p. 116.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 784, pl. 27, fig. 4.

Richmond: Stony Mountain, Manitoba (Stony Mountain); Anticosti (English Head); Ohio; Indiana; Kentucky (Arnheim and Waynesville).

Cotypes.—Cat. No. 44064, U.S.N.M.

Bythopora subgracilis (Ulrich).

Homotrypella? *subgracilis* Ulrich, Geol. Minnesota, 3, 1893, p. 230, pl. 26, figs. 10-16.

Bythopora subgracilis Baesler, Bull. U. S. Nat. Mus., 77, 1911, pp. 241, 242, figs. 135, 136.

Black River (Decorah): Minneapolis, Minnesota, and vicinity.

Ordovician (Wassaleem): Uxnorm, Esthonia, Russia.

Cotypes and plesiotypes.—Cat. Nos. 43558, 57314, U.S.N.M.

BYTHOTREPHIS Roemer. See *Buthotrephis* Hall.

BYTHOTRYPA Ulrich. See *Favositella* Etheridge and Foord.

CACTOGRAPTUS Ruedemann.

Genotype: *C. crassus* Ruedemann.

Cactograptus Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 196.

Cactograptus crassus Ruedemann.

Cactograptus crassus Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 197, pl. 8, fig. 1, figs. 99-101.

Upper Clinton: Clinton, Oneida County, New York.

CALAMENA Eaton. See *Calymene* Brongniart.

CALAMOPORA Goldfuss. See *Favosites* Lamarck.

Calamopora cellulata Castelnau.

Not recognized.

Calamopora cellulata Castelnau, Syst. Sil. l'Amer. Nord., 1843, p. 46.

Silurian: Point Latour, Lake Huron.

CALAMOPORA FAVOSA Goldfuss. See *Favosites favosus*.

CALAMOPORA FIBROSA Eichwald. See *Dianulites petropolitana*.

CALAMOPORA FIBROSA Roemer. See *Hindia sphaeroidalis*.

CALAMOPORA FORBESI var. *DISCOIDEA* Roemer. See *Favosites discoidea*.

CALAMOPORA GOLDFUSSI Castelnau. See *Favosites goldfussi*.

CALAMOPORA GOTHLANDICA Goldfuss. See *Favosites gothlandica*.

CALAMOPORA MAXIMUS Troost. See *Favosites maxima*.

Calamopora minuta Castelnau.

Not recognized.

Calamopora minuta Castelnau, Terr. Sil. de l'Amer. du Nord, 1846, p. 46.

Silurian: Drummond Island, Lake Huron, etc.

Calamopora minutissima Castelnau.

Not recognized.

Calamopora minutissima Castelnau, Terr.-Sil. de l'Amer. du Nord, 1843, p. 46, pl. 18, fig.

Silurian: Drummond Island, Lake Huron.

Calamopora radians Castelnau.

Calamopora radians Castelnau, Terr.-Sil. de l'Amer. Nord, 1843, p. 46, pl. 18, fig. 1.

Silurian: Buffalo, New York.

Observation.—Not recognized. Figure represents basal side of some *Favosites*, probably a Devonian species.

CALAMOPORA VENUSTA Rominger. See *Favosites hisingeri*.

Calamopora verneuili Castelnau.

Calamopora Verneuili Castelnau, Sil. Syst., 1843, p. 47.

Ordovician: Near Quebec, Canada.

Observation.—Not recognized. Refers to some ramose trepostomatous bryozoan with monticules.

CALAPŒCIA Billings.Genotype: *C. canadensis* Billings.

- Calapœcia* Billings, Canadian Nat. Geol., n. s., 2, 1865, p. 425.—Nicholson, Tab. Corals Pal. Period, 1879, p. 162.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 433.—Miller, N. A. Geol. Pal., 1889, p. 174.—James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 4, 1893, p. 150.—Sardeson, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 10, 1896, p. 295.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 32, No. 1, 1899, p. 24.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 42.—Etheridge, Rec. Australian Mus., 5, 1903, p. 18.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 699.
- Columnopora* Nicholson, Geol. Mag., dec. 2, 1, 1874, p. 253; Geol. Surv. Ohio, Pal., 2, 1875, p. 186; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 25; Tab. Corals Pal. Period, 1879, p. 159.—Zittel, Handb. Pal., 1, Munich, 1879, p. 237.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 433.—Beescher, Trans. Connecticut Acad. Arts and Sci., 8, 1891, p. 212.—Lindström, Kongl. Sven. Vet.-Acad. Handl., 32, No. 1, 1899, p. 25. (Genotype: *C. cribriformis* Nicholson.)
- Houghtonia* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 18.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 433.—Sardeson, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 10, 1896, p. 276.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 32, No. 1, 1899, p. 25. (Genotype: *H. huronica* Rominger.)

***Calapœcia anticostiensis* Billings.**

- Calapœcia* Anticostiensis Billings, Canadian Nat. Geol., n. s., 2, 1865, p. 426; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 32, figs. 15a, b.—Nicholson, Tab. Corals Pal. Period, 1879, p. 163.

- Calapœcia* Canadensis Billings, Canadian Nat. Geol., n. s., 2, 1865, p. 426.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 43, pl. 1, figs. 6, 6a, 7.—Nicholson, Tab. Corals Pal. Period, 1879, p. 163.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 2, pt. 3, 1897, p. 157.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 154.

- Richmond and Gamachian (English Head—Ellis Bay): Gamache Bay, etc., Anticosti (*C. anticostiensis*).

- Black River: Near Ottawa, Canada; Baffin Land, etc. (*A. canadensis*).

- Observation.—Although considered the same species at present, *C. canadensis* may be an early variety of *C. anticostiensis*. It is also possible that the types of *C. canadensis* were derived from the Richmond and not from the Black River.

***Calapœcia borealis* Whitfield.**

- Calapœcia* borealis Whitfield, Bull. Amer. Mus. Nat. Hist., 13, 1900, p. 20, pl. 2, figs. 3-7.

- Niagaran: Cape Harrison, Princess Marie Bay, Greenland.

CALAPŒCIA CANADENSIS Billings (part). See *Calapœcia anticostiensis*.***Calapœcia cribriformis* (Nicholson).**

- Columnopora* cribriformis Nicholson, Geol. Mag., dec. 2, 1, 1874, p. 253; Geol. Surv. Ohio, Pal., 2, 1875, p. 187, pl. 22, figs. 8, 8b; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 25; Tab. Corals Pal. Period, 1879, p. 164, pl. 7, figs. 2-2d.—Whiteaves, Rep. Progr., Geol. Surv. Canada, 1880, p. 48C; 1881, p. 570.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 434, fig. 103.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 5, figs. 2, 4, 5; pl. 6, fig. 2.

- Calapœcia* cribriformis Miller, N. A. Geol. Pal., 1889, p. 175, fig. 141.—James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 4, 1893, p. 150.—Sardeson, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 10, 1896, p. 295, text figs. 23, 24.—Foerste, Amer. Geology, 31, 1903, pp. 343, 345.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 701, pl. 1, figs. 3-3b; pl. 5, fig. 1.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 310, pl. 11, fig. 4.

Calapoecia cribriformis—Continued.

Houghtonia huronica Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 18, pl. 3, figs. 3, 4.—Sardeson, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 10, 1896, p. 276, 277, text fig. 13, 14.

Calapoecia Huronensis Billings, Canadian Nat. Geol., n. s., 2, 1865, p. 426.—Nicholson, Tab. Corals Pal. Period, 1879, p. 163.

Columnopora rayi Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 5, figs. 1, 3; pl. 6, fig. 1.

Richmond: Waynesville, Clarksville, Oxford, Ohio; Richmond, Indiana; Marion and other counties in Kentucky (Waynesville-Elkhorn); Anticosti (Charleton); Ontario, Drummond Isle, etc.

Calapoecia favositoides Savage.

Calapoecia favositoides Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 64, pl. 3, figs. 1-3.

Upper Medinan (Edgewood): Near Edgewood and Louisiana, and south of Clarksville, Pike County, Missouri.

CALAPOECIA HURONENSIS Billings. See *Calapoecia cribriformis*.

CALATHIUM Billings.

Genotype: *C. formosum* Billings.

Calathium Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, pp. 208, 209.—Hinde, Quart. Jour. Geol. Soc. London, 45, 1889, p. 144.—Miller, N. A. Geol. Pal., 1889, p. 155.

Calathium affine Billings.

Calathium affine Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 209, fig. 193. Canadian (Quebec—G): Cape Norman, Newfoundland.

Calathium anstedti Billings.

Calathium Anstedti Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 210, fig. 194; p. 337, figs. 325a, b.—Hinde, Quart. Jour. Geol. Soc. London, 45, 1889, p. 144.

Canadian (Quebec—H): Pistolet Bay, Newfoundland.

Calathium canadense Billings.

Calathium Canadense Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 377, text fig. 351.—Miller, N. A. Geol. Pal., 1889, p. 155, text fig. 93.

Chazyan (Mingan): Mingan Islands, Canada.

Calathium fittoni Billings.

Calathium Fittoni Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 211, fig. 195. Chazyan (Quebec): Point Rich, Newfoundland.

Calathium formosum Billings.

Calathium formosum Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 209, fig. 192.—Miller, N. A. Geol. Pal., 1889, p. 155, fig. 94.

Canadian (Quebec—G): Cape Norman, Newfoundland.

Calathium (?*Zittellella*) *infelix* Ulrich and Everett.

Calathium (?*Zittellella*) *infelix* Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 274, pl. 5, figs. 1, 1a.

Black River (Platteville): Near Dixon, Illinois.

Calathium? *pannosum* Billings.

Calathium? *pannosum* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 335, figs. 324a, b.

Ozarkian? (Levis-erratic): Point Levis, Quebec.

CALATHIUM? PARADOXICUM Billings. See *Nipterella paradoxa*.

CALAUROPS Whitfield. See *Eccyliomphalus* Portlock.

Calceocrinus of authors. See *Deltacrinus*, *Eucheirocrinus*, and *Cremacrinus*.

Calceocrinus Hall.

Not recognized.

Calceocrinus Hall, Pal. New York, 2, 1852, p. 352, pl. 85, figs. 5, 6.—Ulrich, 14th Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 104.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 154.

Observation.—This genus was based upon a small triangular plate without a specific name and according to the rules of nomenclature can not be retained.

CALCEOCRINUS ALLENI Rowley. See *Deltacrinus allenii*.

CALCEOCRINUS ARTICULOSUS Wachsmuth and Springer. See *Cremacrinus articulosa*.

CALCEOCRINUS BARRANDEI Walcott. See *Cremacrinus barrandei*.

Calceocrinus bidentatus Ringueberg.

Calceocrinus bidentatus Ringueberg, Ann. New York Acad. Sci., 4, 1889, p. 404, pl. 10, fig. 10.

Clinton (Rochester): Lockport, New York.

Observation.—Description and figure insufficient for recognition.

CALCEOCRINUS CHRYSALIS Shumard. See *Eucheirocrinus chrysalis*.

CALCEOCRINUS CONTRACTUS Ringueberg. See *Deltacrinus contractus*.

CALCEOCRINUS FURCILLATUS Billings. See *Cremacrinus furcillatus*.

CALCEOCRINUS HALLI Ringueberg. See *Deltacrinus halli*.

CALCEOCRINUS INÆQUALIS Wachsmuth and Springer. See *Cremacrinus inæqualis*.

CALCEOCRINUS INDIANENSIS Miller. See *Deltacrinus indianensis*.

CALCEOCRINUS KENTUCKIENSIS Miller and Gurley. See *Cremacrinus articulosa*.

CALCEOCRINUS RADICULUS Ringueberg. See *Eucheirocrinus radiculatus*.

CALCEOCRINUS RUGOSUS Billings. See *Cremacrinus rugosus*.

CALCEOCRINUS STIGMATUS Hall. See *Deltacrinus stigmatus*.

CALCEOCRINUS TUNICATUS Hall. See *Deltacrinus tunicatus*.

CALCEOCRINUS TYPUS Ringueberg. See *Deltacrinus typus*.

CALCEOLA Lamarck.

Genotype: *C. sandalina* Lamarck.

Calceola Lamarck, Syst. Anim. sans Vert., 1801, p. 139.—Eichwald, Zool. Specialis, pt. 1, Vilnae, 1829, p. 289.—Steininger, Mem. Soc. Geol. France, 1, 1834, p. 366.—Fischer de Waldheim, Oryctographie Gouv. de Moscou, 1837, p. 146.—Phillips, Pal. Foss. Cornwall, Devon, and W. Somerset, 1841, p. 54.—McCoy, Syn. Char. Carb. Foss. Ireland, 1844, pp. 103, 105.—Murchison, Verneuil, Keyserling, Geol. Russie d'Europe et Mont d l'Oural, 2, 845, p. 45.—Davidson, Brit. Foss. Brachiopoda, Pal. Soc., 1853, p. 120.—Carpenter, ibid., p. 37.—Woodward, Man. Mollusca, pt. 2, 1854, p. 232, fig. 152; pl. 15, fig. 26.—Davidson, Mem. Soc. Linneenne de Normandie, 10, 1856, p. 224.—Pictet, Traite Pal., 2d ed., 4, 1857, p. 65.—Goldfuss, Petrefacta Germaniae, 2d ed., pt. 2, 1863, p. 273.—Lindstrom, Geol. Mag., 3, 1866, pp. 359, 408, 411.—Dybowski, Archiv. f. Natur. Liv-, Ehst-und Kurl., 5, 1873, p.

CALCEOLA—Continued.

340.—Zittel, Handb. Pal., 1, 1879, p. 236.—Lindstrom, Bihang till K. Sv. Vet.-Akad. Handl., 7, No. 4, 1882, p. 10.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 405.—Miller, N. A. Geol. Pal., 1889, p. 175.—Sherzer, Amer. Geol., 7, 1891, pp. 296-301.—Koken, Die Leitfossilien, Leipzig, 1896, p. 312, fig. 235.—Zittel-Eastman Textb. Pal., 1, 1900, p. 80.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 77.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 88.

Rhizophyllum Lindström, Ofver. K. Vet.-Akad. Forhandl., 22, No. 5, 1865, p. 287; Geol. Mag., 3, 1866, pp. 359, 411.—Dybowski, Archiv f. Natur. Liv-, Ebst- und Kurl., 5, 1873, p. 340.—Zittel, Handbuch d. Pal., 1, Munich, 1879, p. 235.—Lindstrom, Bihang till K. Sv. Vet.-Akad. Handl., 7, No. 4, 1882, p. 22.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 407.—Sherzer, Amer. Geologist, 7, 1891, pp. 296-301.—Koken, Die Leitfossilien, 1896, p. 313.—Pocta, Syst. Sil. du Centre Boheme, 8, pt. 2, 1902, p. 179. (Genotype: *Calceola gotlandica* Roemer.)

CALCEOLA AMERICANA Safford. See *Calceola tennesseensis*.

Calceola (Rhizophyllum) attenuata (Lyon).

Calceola attenuatus Lyon, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 45.

Rhizophyllum attenuatum Lindström, Bihang till K. Sv. Vet.-Akad. Handl., 7, No. 4, 1882, p. 38, pl. 3, fig. 17.

Calceola proteus Davis (part), Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, pl. 131, figs. 1, 2, 12.

Niagaran (Louisville): Near Louisville, Kentucky.

Plesiotype.—Cat. No. 52774, U.S.N.M.

Calceola (Rhizophyllum) corniculum (Lyon).

Calceola corniculum Lyon, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 43.

Calceola coxii Lyon, *ibid.*, 1879, p. 44.

Calceola pusilla Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 419 (ext. 1882, p. 15).

Calceola proteus Davis (part), Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 101, fig. 2, pl. 131, figs. 3-11, 13-17.

Niagaran (Louisville): Near Louisville, Kentucky.

Plesiotypes.—Cat. No. 52774, U.S.N.M.

CALCEOLA COXII Lyon. See *Calceola (Rhizophyllum) corniculum*.

CALCEOLA PROTEUS Davis. See *Calceola (Rhizophyllum) attenuatus* and *Calceola (Rhizophyllum) corniculum*.

CALCEOLA PUSILLA Hall. See *Calceola (Rhizophyllum) corniculum*.

CALCEOLA SANDALINA Troost. See *Calceola tennesseensis*.

Calceola (Rhizophyllum) tennesseensis Roemer.

Calceola sandalina Troost (not Lamarck), Trans. Geol. Soc. Pennsylvania, 1, 1835, p. 249; 5th Geol. Rep. Tennessee, 1840, p. 47.—Verneuil, Bull. Geol. Soc. France, 1840, p. 176.

Calceola tennesseensis Roemer, Leth. Geogn., 3d ed., Th. 2, 1854, p. 385; Sil. Fauna West Tennessee, 1860, p. 73, pl. 5, figs. 1a-e.—Lindström, Geol. Mag., 3, 1866, p. 411.—Safford, Geol. Tennessee, 1869, p. 321, pl. 5 (H), figs. 4a-e.—Lyon, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 43, footnote.—Förster, Jour. Geol., 11, 1903, p. 712 (loc. occ.).—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 77, fig. 121.

Calceola (Rhizophyllum) tennesseensis—Continued.

Calceola Americana Safford, Amer. Jour. Sci. and Arts, 2d ser., 29, 1860, p. 248.

Rhizophyllum tennesseense Lindström, Bihang till k. Sv. Vet.-Akad., 7, No. 4, 1882, p. 30, pl. 3, fig. 14; pl. 9, figs. 3-5.—Roemer, Leth. Geog., pt. 1, Leth. Pal., 1883, p. 408.

Niagaran (Brownspert): Decatur, Perry, Wayne, and Hardin Counties, Tennessee.

CALLICRINITES D'Orbigny. See *Callicrinus* D'Orbigny.

CALLICRINUS D'Orbigny.

Genotype: *C. costatus* Hisinger.

Callicrinites D'Orbigny, Prodr. Pal. Strat., 1, 1849, p. 45; Cour. Element. Pal. Geol., 2, 1851, p. 141.—Chapman, Canadian Jour., n. s., 2, 1857, p. 304.

Callicrinus Pictet, Traite Pal., 2d ed., 4, 1857, p. 301.—Angelin, Icon. Crinoid., 1878, p. 14.—Zittel, Handb. Pal., 1, 1879, p. 378.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1885, p. 357. (Rev. Pal., pt. 3, sec. 1, p. 135).—Ringueberg, Ann. New York Acad. Sci., 5, 1890, p. 302.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 675; 18th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1893, p. 260.—Weller, Jour. Geol., 5, 1897, p. 744, footnote; Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 117, fig. 47.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 164, fig. 77.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 149.—Zittel, Grundzuge Pal., 1, 1910, p. 164.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 560.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 192.

Cryptodiscus Hall, 20th Rep. New York State Cab. Nat. Hist., 1865, pl. 11, fig. 8; rev. ed., 1868, pl. 11 (2), fig. 18.—Weller, Jour. Geol., 5, 1897, p. 744 (footnote pp. 803-808).—Anon. (?Bather), Nat. Sci., 12, 1898, p. 154.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 121.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 164.

Callicrinus acanthinus Ringueberg.

Callicrinus acanthinus Ringueberg, Ann. New York Acad. Sci., 5, 1890, p. 302, pl. 3, fig. 1.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., 20, Harvard, 1897, p. 356, pl. 83, fig. 18.

Niagaran (Lockport-Gasport member): Lockport, New York.

Callicrinus beachleri Wachsmuth and Springer.

Callicrinus beachleri Wachsmuth and Springer, Amer. Geol., 10, 1892, p. 140; Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 355, pl. 83, fig. 14a, b.

Niagaran (Laurel): St. Paul, Indiana.

Callicrinus bifurcatus Weller.

Callicrinus bifurcatus Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 125, pl. 8, fig. 7.

Niagaran (Racine): Joliet, Illinois.

Callicrinus bilobus (Weller).

Cryptodiscus bilobus Weller, Jour. Geol., 5, 1897, p. 749, pl., fig. 8.

Callicrinus bilobus Weller, Jour. Geol., 5, 1897, p. 808; Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 125, pl. 10, fig. 4.

Niagaran: (Racine): Joliet, Illinois.

Callicrinus cornutus (Hall).

Eucalyptocrinus cornutus Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 322, pl. 11 (2), figs. 8-10; rev. ed., 1870, p. 363, pl. 11, figs. 8-10.—Whitfield, Geol. Wisconsin, 4, 1882, p. 285, pl. 16, figs. 5-8.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 191, fig.

Callierinus cornutus—Continued.

Eucalyptocrinus cornutus var. *excavatus* Hall, 20th Rep. New York State Cab. Nat. Hist. (extras 1865), 1867, p. 322, pl. 11 (2), figs. 6, 7; rev. ed. 1870, p. 364, pl. 11, figs. 6-7.

Callierinus cornutus Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 21, 1897, p. 357, pl. 83, figs. 15-17.—Anon. (Bather?), Nat. Sci., 12, 1898, p. 155.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, 1900, p. 118, pl. 8, figs. 1-3.

Niagaran (Racine): Waukesha and Racine, Wisconsin; Bridgeport and Romeo, Illinois.

Callierinus corrugatus (Weller).

——— Miller, 18th Rep. Geol. Nat. Hist. Indiana, 1894, p. 260, pl. 1, fig. 7, (adv. sheets, 1892, p. 6, pl. 1, fig. 7).

Cryptodiscus corrugatus Weller, Jour. Geol., 5, 1897, p. 747, pl., figs. 1, 2; p. 808.

Callierinus corrugatus Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 123, pl. 11, figs. 6, 7.

Niagaran (Racine): Joliet, Illinois

Callierinus desideratus Weller.

Callierinus ——— Weller, Jour. Geol., 5, 1897, pp. 805-806, figs. 2-4, 7-8.

Callierinus desideratus Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 122, pl. 9, fig. 2; pl. 10, fig. 3; pl. 11, figs. 1-3.

Niagaran (Racine): Racine, Wisconsin.

Callierinus digitatus (Weller).

Cryptodiscus digitatus Weller, Jour. Geol., 5, 1897, p. 749, pl., figs. 6, 7, 5?; p. 808.

Callierinus digitatus Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 124, pl. 9, figs. 3, 4; pl. 11, fig. 5.

Niagaran (Racine): Lemont and Joliet, Illinois.

Callierinus hydei (Weller).

Cryptodiscus hydei Weller, Jour. Geol., 5, 1897, p. 748, pl., figs. 3, 4.

Callierinus hydei Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 124, pl. 8, fig. 8; pl. 9, fig. 1; pl. 10, figs. 1, 2.

Niagaran (Racine): Romeo and Joliet, Illinois; Racine, Wisconsin.

Callierinus longispinus Weller.

Callierinus longispinus Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 119, pl. 8, figs. 4, 5.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 560.

Niagaran (Racine): Joliet, Illinois.

Callierinus pentangularis Weller.

Callierinus pentangularis Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 120, pl. 8, fig. 6.

Niagaran (Racine): Bridgeport, Illinois.

Callierinus? ramifer (Roemer).

Eucalyptocrinus ramifer Roemer, Sil. Fauna., West Tennessee, 1860, p. 51, pl. 4, figs. 4a, 4b.

Callierinus? ramifer Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard. (N. A. Crin. Cam.), 20, 1897, p. 358.

Niagaran (Brownport): Decatur and Wayne counties, Tennessee.

CALLITHAMNOPSIS Whitfield.Genotype: *Oldhamia fruticosa* Hall.

Callithamnopsis Whitfield, Bull. Amer. Mus. Nat. Hist., 6, 1894, pl. 354; Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 42.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 721.—Ruedemann, Bull. New York State Mus., 133, 1900, p. 201.

Callithamnopsis delicatula Ruedemann.

Callithamnopsis delicatula Ruedemann, Bull. New York State Mus., 133, 1900, p. 203, pl. 1, fig. 5; pl. 2, figs. 1, 2.

Black River (Lowville): Glens Falls, New York.

Callithamnopsis fruticosa Whitfield.

Oldhamia fruticosa Hall (part), Canadian Org. Rem., dec. 2, 1865, p. 50 (name only).

Callithamnopsis fruticosa Whitfield, Bull. Amer. Mus. Nat. Hist., 6, 1894, p. 354, pl. 11, figs. 4-8; Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 42, pl. 4, figs. 4-8.—Ruedemann, Bull. New York State Mus., 133, 1900, p. 202, figs. 4-8, pl. 1, figs. 3, 4.

Black River (Platteville): Platteville, Wisconsin.

CALLOCYSTIS (part) Haeckel. (See *Callocystites* Hall.)**CALLOCYSTITES** Hall.Genotype: *C. jewetti* Hall.

Callocystites Hall, Pal. New York, 2, 1852, pp. 238, 248.—Chapman, Canadian Jour., n. s., 2, 1857, p. 303.—Pictet, *Traité Pal.*, 2d ed., 4, 1857, p. 298.—Hall, Pal. New York, 3, 1861, p. 151.—Zittel, *Handb. Pal.*, 1, 1879, p. 421.—Miller, N. A. Geol. Pal., p. 230.—Jaekel, *Stammesg. Pelmat.*, 1, *Thecoidea u. Cystoidea*, 1899, p. 289.—Zittel-Eastman *Textb. Pal.*, 1, 1900, p. 187.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 151; Bull. New York State Mus., 45, 1901, p. 151.—Schuchert, *Smiths. Misc. Coll.*, 47, 1904, p. 242.—Zittel, *Grundzuge Pal.*, 1, 1910, p. 188.—Grabau and Shimer, N. A. *Index Fossils*, 2, 1910, p. 469.

Callocystis Haeckel, *Amphorideen u. Cystoideen*, Leipzig, 1896, p. 131.—Bather, *Treatise on Zool.*, pt. 3, *Echinoderma*, London, 1900, p. 62, fig. 31.

Anthocystis Haeckel, *Amphorideen u. Cystoideen*, Leipzig, 1896, p. 132, pl. 3, figs. 23, 24.—Bather, *Treatise on Zool.* (Lanckester), pt. 3, 1900, p. 62.—Springer, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 153.

(Genotype: *Anthocystis halliana* Haeckel = *Callocystites jewetti* Hall).

Callocystites canadensis (Billings).

Apiocystites Canadensis Billings, *Cat. Sil. Foss. Anticosti*, Geol. Surv. Canada, 1866, p. 90.

Callocystites canadensis Schuchert, *Smiths. Misc. Coll.*, 47, 1904, p. 245, pl. 34, fig. 3.—Grabau and Shimer, N. A. *Index Fossils*, 2, 1910, p. 470, fig. 1780.

Callocystites tripectinatus Ringueberg, Bull. Buffalo Soc. Nat. Sci., 5, 1896, p. 12, pl. 1, fig. 10.

Clinton (Rochester): Grimsby, Ontario; Lockport, New York.

Callocystites jewetti Hall.

Callocystites jewettii Hall, Pal. New York, 2, 1852, p. 239, pl. 50, figs. 1-11, 12-18.—Pictet, *Traité Pal.*, 2d ed., 1857, 4, p. 298, pl. 99, fig. 15.—Miller, N. A. Geol. Pal., 1889, p. 230, fig. 260.—Jaekel, *Stammesg. Pelmat.*, 1, *Thecoidea u. Cystoidea*, 1899, p. 290, fig. 64, p. 291, pl. 15, figs. 1, 1a-c.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 151, fig. 47; Bull. New York State Mus., 45, 1901, p. 151, fig. 47.—Schuchert, *Smiths. Misc. Coll.*, 47, 1904, p. 243, fig. 35, pl. 34, figs. 1, 2.—Grabau and Shimer, N. A. *Index Fossils*, 2, 1910, p. 469, fig. 1779.

Callocystites jewetti—Continued.

Callocystis Jewetti Zittel, Handb. Pal., 1, Munich, 1879, p. 410, fig. 290; p. 421, fig. 297.—Haeckel, Amphorideen u. Cystoideen, 1896, p. 131, pl. 3, figs. 21, 22.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 62, fig. 31.

Anthocystis Halliana Haeckel, Amphorideen u. Cystoideen, Leipzig, 1896, p. 132, pl. 3, figs. 23, 24.

Clinton (Rochester): Lockport, New York, and vicinity; Grimsby, Ontario.

CALLOCYSTITES TRIPECTINATUS Ringueberg. See *Callocystites canadensis*.

CALLOGRAPTUS Hall.

Genotype: *C. elegans* Hall.

Callograptus Hall, Geol. Surv. Canada, dec. 2, 1865, p. 133; 20th Rep. New York State Cab. Nat. Hist., 1868, p. 218; rev. ed., 1870, p. 252.—Nicholson, Mon. Brit. Graptolit., 1872, p. 128.—Hopkinson, Ann. Mag. Nat. Hist., 4th ser., 10, 1872, p. 233.—Zittel, Handb. Pal., 1, Munich, 1879, p. 289.—Spencer, Amer. Nat., 8, 1882, pp. 458–462, p. 165; Bull. Mus. Univ. State Missouri, 1, 1884, p. 20; Trans. Acad. Sci. St. Louis, 4, 1884, pp. 562, 570.—Miller, N. A. Geol. Pal., 1889, p. 175.—Pöcta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 179.—Matthew, Trans. New York Acad. Sci., 14, 1895, p. 271, pl. 48, fig. 5.—Roemer and Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 576.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 583, 584; Mem. 11, pt. 2, 1908, p. 146.

Callograptus compactus (Walcott).

Dendrograptus compactus Walcott, Trans. Albany Inst., 10, 1883, p. 21, pl. 1, fig. 1 (adv. sheets, 1879).—Gurley, Jour. Geol., 4, 1896, p. 94.

Callograptus compactus Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 146, fig. 52, pl. 1, fig. 1.

Utica: Holland Patent, Oneida County, New York.

Callograptus diffusus (Hall).

Dendrograptus? (*Callograptus?*) *diffusus* Hall, Canadian Org. Rem., dec. 2, 1865, p. 132, pl. 18, figs. 1–3; 20th Rep. New York State Cab. Nat. Hist., 1868, pl. 4, fig. 12; rev. ed., 1870, p. 224, pl. 4, fig. 12.

Dendrograptus? *diffusus* Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 664, pl. 36, figs. 7a, 7b.

Callograptus diffusus Ruedemann, Ann. Rep. New York State Pal., 1902, p. 570.

Callograptus cf. *diffusus* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 586–587, fig. 20, pl. 4, fig. 7.

Canadian: Point Levis, Quebec (*Levis*, *Diplograptus dentatus* zone); Deepkill, Rensselaer County, New York (Deepkill).

Ordovician (Lower Arenig): Ramsey Island, Wales.

Callograptus elegans Hall.

Callograptus elegans Hall, Geol. Surv. Canada, dec. 2, 1865, p. 134, pl. 19, figs. 1–4; pl. 18, fig. 4; 20th Rep. New York State Cab. Nat. Hist., 1868, pl. 4, fig. 15; rev. ed., 1870, p. 224, pl. 4, fig. 15.—Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 666, pl. 36, fig. 9.—Roemer and Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 577.

Canadian (*Levis*, *Didymograptus* zone): Gros Maule, Quebec; Newfoundland.

Ordovician (Lower Arenig): Wales.

CALLOGRAPTUS GRABAU Hahn. See *Dictyonema furciferum*.

CALLOGRAPTUS GRANT Spencer. See *Odontocaulis granti*.

Callograptus minutus Spencer.

Callograptus minutus Spencer, Canadian Nat., 10, 1882, p. 165, nom. nud.; Trans. Acad. Sci. St. Louis, 4, 1884, p. 572, pl. 1, fig. 12; Bull. Mus. Univ. State Missouri, 1, 1884, pp. 14, 22, pl. 1, fig. 12.—Gurley, Jour. Geol., 4, 1896, pp. 93, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 14, 15, fig. 13.

Niagaran dolomite: Hamilton, Ontario.

Callograptus minutus altus Gurley.

Callograptus minutus altus (Gurley MS.), Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 15, fig. 16.

Niagara dolomite: Hamilton, Ontario.

Callograptus multicaulis Spencer.

Callograptus (*Dendrograptus*) *multicaulis* Spencer, Canadian, 10, 1882, p. 165, nom. nud.

Callograptus multicaulis Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 572, pl. 1, fig. 11; Bull. Mus. Univ. State Missouri, 1, 1884, p. 22, pl. 1, fig. 11.—Gurley, Jour. Geol., 4, 1896, pp. 93, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 13, fig. 14.

Niagaran dolomite: Hamilton, Ontario.

Callograptus niagarensis Spencer.

Callograptus Niagarensis Spencer, Canadian Nat., n. s., 8, 1878, p. 463; Trans. Acad. Sci. St. Louis, 4, 1884, p. 571, pl. 1, fig. 9; Bull. Mus. Univ. State Missouri, 1, 1884, p. 21, pl. 1, fig. 9.—Miller, N. A. Geol. Pal., 1889, p. 175, fig. 144.—Gurley, Jour. Geol., 4, 1896, pp. 93, 308.—Bassler, Bull. U. S. Mus., 65, 1909, pp. 13, 14, fig. 15.

Niagaran dolomite: Hamilton, Ontario.

Callograptus salteri Hall.

Callograptus salteri Hall, Canadian Org. Rem., dec. 2, Geol. Surv. Canada, 1865, p. 135, pl. 19, figs. 5-8; 20th Rep. New York State Cab. Nat. Hist., 1868, pl. 4, figs. 13, 14; rev. ed., 1870, p. 224, pl. 4, figs. 13, 14.—Hopkinson and Lapworth, Quart. Jour. Geol. Soc. London, 31, 1875, p. 667, pl. 36, fig. 10.—Gurley, Jour. Geol., 4, 1896, p. 300.—Roemer and Frech, Leth. pal., 1, 1897, p. 577, fig. 146.—Ruedemann, Ann. Rep. New York State Pal., 1902, pp. 554, 555, 565.—Cleland, Bull. Amer. Pal., 4, 1903, p. 20, pl. 4, fig. 4.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 584-586, figs. 18, 19, pl. 3, figs. 13-15.

Canadian: Point Levis, Quebec (*Levis*, *Didymograptus*, and *Diplograptus dentatus* zones); Deepkill, Rensselaer County, New York (*Deepkill*); Tribes Hill and Fort Hunter, New York.

Ordovician (Middle Arenig): St. Davids, Wales.

Callograptus strictus Gurley.

Callograptus strictus (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 15, fig. 17; pl. 3, fig. 3.

Niagaran dolomite: Hamilton, Ontario.

CALLONEMA Hall.

Genotype: *Loxonema bellatula* Hall.

Callonema Hall, Pal. New York, 5, pt. 2, 1879, p. 50.—Pilsbry, Zittel-Eastman Textb. Pal., 1, 1900, p. 458.

Callonema pristina Savage.

Callonema pristina Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 117, pl. 7, fig. 20.

Upper Medinan (*Channahon*): Near Channahon, Will County, Illinois.

CALLOPORA Dybowski. See *Diplotrypa* Nicholson.

CALLOPORA Hall. See *Hallopora* Bassler.

CALLOPORA ASPERA Hall. See *Lioclema asperum*.

Callopora?? cervicornis Hall.

Callopora cervicornis Hall, Trans. Albany Institute, 10, 1883, p. 59 (abstract, 1879, p. 3); 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 238.

Niagaran (Waldron): Waldron, Indiana.

Observation.—Can not be recognized without a restudy of the types.

CALLOPORA CRENULATA Ulrich. See *Halloporina crenulata*.

Callopora?? diversa Hall.

Callopora? diversa Hall, Trans. Albany Institute, 10, 1883, p. 60 (abstract, 1879, p. 4); 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 239.

Niagaran (Waldron): Waldron, Indiana.

Observation.—Can not be recognized without a restudy of the types.

CALLOPORA EXSUL Hall. See *Lioclema? exsul*.

CALLOPORA FLORIDA Hall. See *Nicholsonella florida*.

CALLOPORA LAMINATA Hall. See *Fistulipora laminata*.

CALLOPORA MILFORDENSIS James. See *Ceramoporella granulosa milfordensis*.

CALLOPORA NANA Nicholson. See *Hallopora elegantula*.

CALLOPORA NUMMIFORMIS Hall. See *Mesotrypa nummiformis*.

CALLOPORA OHIOENSIS Foerste. See *Lioclemella ohioensis*.

CALLOPORA RAMOSA var. *RUGOSA* of authors. See *Hallopora rugosa*.

CALLOPORA SIGILLARIOIDES Nickles. See *Hallopora onealli sigillarioides*.

CALLOPORA SINGULARIS Hall. See *Trematopora? singularis*.

CALLOPORELLA Ulrich. Genotype: *Calloporella harrisi* Ulrich = *Monticulipora (Heterotrypa) circularis* James.

Calloporella Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 154.—Miller, N. A. Geol. Pal., 1889, p. 296.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 373, 418.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1907, p. 36.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 742.

Calloporella circularis (James).

Monticulipora (Heterotrypa), circularis James, Paleontologist, No. 6, 1882, p. 46.

Monticulipora circularis James, Paleontologist, No. 7, 1883, p. 58, pl. 1, figs. 3, 3a.

Calloporella harrisi Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 91, pl. 1, figs. 5, 5c.

Monticulipora lens (not *Nebulipora lens* McCoy) James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 165.—J. F. James, *ibid.*, 16, 1894, p. 181.

Calloporella circularis Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 193.—Bassler, Proc. U. S. Nat. Mus., 1906, p. 25.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 797, pl. 10, figs. 6, 6c.

Richmond (Waynesville): Oxford, Waynesville, etc., Ohio; Indiana.

Plenotype.—Cat. No. 40386, U.S.N.M. (Holotype of *O. harrisi*).

CALLOPORELLA HARRISI Ulrich. See *Calloporella circularis*.

Calloporella? lens (Whitfield).

Fistulipora lens Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1877, 1878, p. 69; Geol. Surv. Wisconsin, 4, 1882, p. 256, pl. 11, figs. 5, 6.—Buell, Trans. Wisconsin Acad. Sci., 5, 1882, p. 188.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 173, fig.

Calloporella? lens—Continued.

Calloporella? lens Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 194 (gen. ref.).

Richmond (Maquoketa): Delafield, Wisconsin.

Calloporella? nodulosa Ulrich.

Calloporella? nodulosa Ulrich, Geol. Surv. Illinois, 8, 1890, p. 418, pl. 33, figs. 4, 4a.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 194.

Monticulipora verrucosa J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1896, p. 85.

Richmond (Maquoketa): Savannah, Illinois.

CALLOPORELLA? NUMMIFORMIS Ulrich. See *Mesotrypa nummiformis*.

CALLOPORINA Ulrich and Bassler. See *Halloporina* Bassler.

CALOPHYLLUM PHRAGMOCERAS Salter. See *Amplexus phragmoceras*.

CALOSTYLIS Lindström.

Genotype: *C. denticulata* Kjerulf.

Calostylis Lindström, Ofver K. Vet.-Akad. Forhandl., 25, 1868, p. 421.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1878, p. 63.—Zittel, Handb. Pal., 1, 1879, p. 241.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 393.—Frech, Palaeontographica, 37, 1890, p. 43.—Koken, Die Leitfossilien, 1896, p. 307.

Calostylis spongiosa Foerste.

Calostylis spongiosa Foerste, Bull. Geol. Surv. Kentucky, 7, 1906, p. 322, pl. 7, figs. 3a-g; pl. 8, figs. 1a, b.

Clinton (Waco): Near Estill Springs, etc., Kentucky.

CALVINELLA Walcott.

Genotype: *Dikelocephalus spiniger* Hall.

Calvinella Walcott, Smiths. Misc. Coll., 57, 1914, p. 388.

Calvinella newtonensis (Weller).

Dikelocephalus newtonensis Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 121, pl. 3, figs. 1-7.

Calvinella newtonensis Walcott, Smiths. Misc. Coll., 57, 1914, p. 389, pl. 70, figs. 7-11, 11a

Upper Cambrian or Ozarkian (Kittatinny): Near Newton, New Jersey.

Calvinella ozarkensis Walcott.

Calvinella ozarkensis Walcott, Smiths. Misc. Coll., 57, 1914, p. 389, pl. 70, figs. 1-6.

Ozarkian (Eminence): Near Eminence, Shannon County, and near Flat River, St. Francois County, Missouri.

Calvinella tenuisculpta Walcott.

Calvinella tenuisculpta Walcott, Smiths. Misc. Coll., 57, 1914, p. 391, pl. 64, figs. 7, 7a.

Pogonip (?Ozarkian): Ridge east of Hamburg Ridge, Eureka District, Nevada.

CALVINIA Savage.

Genotype: *C. edgewoodensis* Savage.

Calvinia Savage, Bull. Geol. Surv., Illinois, 23, 1913, p. 65.

Calvinia edgewoodensis Savage.

Calvinia edgewoodensis Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 66, pl. 2, figs. 15-17.

Upper Medinan (Edgewood): Near Gale, Alexander County, Illinois.

CALYMENE Brongniart.Genotype: *Trilobus tuberculatus* Bronn.

Calymene Brongniart, Hist. Nat. Crust. Foss., 1822, p. 11.—Dekay, Annals Lyceum Nat. Hist. New York, 1, 1824, p. 175, footnote.—Eichwald, Zool. Specialis, pt. 2, Vilnae, 1830, p. 114.—Green, Mon. Tril. N. A., 1832, pp. 15, 27.—Eaton, Geol. Textbook, 2d ed., 1832, p. 31.—Steininger, Mem. Soc. Geol. France, 1, 1834, p. 350.—Murchison, Sil. Syst., 1839, p. 653.—Conrad, 5th Ann. Rep. New York Geol. Surv. 1841, p. 38.—Burmeister, Org. der Tril., 1843, p. 93.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, pp. 541, 558.—Hawle and Corda, Abh. d. k. böhmischen Gesell. d. Wiss., 5 (extract), 1847, p. 85, pl. 5, fig. 50.—Rouault, Bull. Soc. Geol. France, 2d. ser., 4, 1847, p. 318.—Salter, Mem. Geol. Surv. Great Britain, 2, pt. 1, 1848, p. 341.—McCoy, Ann. Mag. Nat. Hist., 2d. ser., 4, 1849, p. 399.—Salter, Mem. Geol. Surv. United Kingdom, dec. 2, 1849, pl. 8.—Barrande, Neues Jahrb. f. Min., etc., 1850, p. 778; Syst. Sil. Centre Boheme, 1, 1852, p. 560.—McCoy, British Pal. Rocks and Fossils, 1854, p. 164.—Pictet, Traité Pal., 2d ed., 2, 1854, p. 503.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 213.—Chapman, Canadian Jour., n. s., 1, 1856, p. 285.—Nieszkowski, Archiv für Naturk. Liv-, Ehst- und Kurl., 50, 1857, p. 540.—Chapman, Canadian Jour., n. s., 8, 1863, p. 31; Expos. Min. Geol. Canada, 1864, p. 139.—Salter, Mon. British Tril., Pal. Soc., 1865, p. 90; Cat. Camb. and Sil. Foss., 1873, pp. 52, 132.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, pp. 139, 140.—Zittel, Handb. Pal., 2, 1885, p. 604.—Clarke, Jour. Morphology, 2, 1888, p. 254.—Hall and Clarke, Pal. New York, 7, 1888, p. xxi, fig. 22.—Miller, N. A. Geol. Pal., 1889, p. 536.—W. D. Mathew, Trans. New York Acad. Sci., 12, 1893, p. 238.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th, ser., 42, 1894, pp. 7, 11.—Walcott, Geol. Mag., dec. 4, 1, 1894, p. 247.—Koken, Die Leitfossilien, Leipzig, 1896, p. 23, fig. 14, 1-3.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, p. 105, pl. 3, fig. 26.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, p. 48.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 224; Bull. New York State Mus., 45, 1901, p. 224.—Jaekel, Zeitz. d. d. geol. Gesell., 53, 1901, pp. 149, 156.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 314.—Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 66.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 724.

Calymmene Angelin, Pal. Scandinavica, 3d ed., Holmiae, 1878, pp. 22, 28.—Pompeckj, Neues Jahrb. f. Min., Geol., Pal., 1, 1898, pp. 187, 196, 217.—Beecher, Zittel-Eastman Textb. Pal., 1, 1900, p. 634; Amer. Jour. Sci., 4th ser., 13, 1902, p. 167.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1051.

***Calymene abbreviata* Foerste.**

Calymene abbreviata Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 83, pl. 3, fig. 17; Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 148.

Trenton (Cynthiana): One mile south of Rogers Gap, Kentucky.

***Calymene altirostris* Van Ingen.**

Calymene altirostris Van Ingen, School of Mines Quart., 23, 1901, p. 35 (nom. nud.)
Niagaran (St. Clair): St. Clair Spring, Independence County, Arkansas.

CALYMENE BECKII Hall. See *Triarthrus becki*.

CALYMENE BLUMENBACHII Foerste. See *Calymene vogdesi*.

CALYMENE BLUMENBACHII Roemer. See *Calymene niagarensis*.

CALYMENE BLUMENBACHII Green. See *Calymene senaria*.

CALYMENE BLUMENBACHII var. **NIAGARENSIS** Hall. See *Calymene niagarensis*.

CALYMENE BLUMENBACHII var. **SENARIA?** Hall. See *Calymene clintoni* and *C. senaria*.

CALYMENE BLUMENBACHII var. **VOGDESI** Foerste. See *Calymene vogdesi*.

CALYMENE BUCKLANDII Anthony. See *Ceraurus milleranus*.

CALYMENE CALLICEPHALA Cummings. See *Calymene meeki*.

Calymene callicephala Green.

Calymene callicephala Green, Mon. Tril. N. A., 1832, p. 30, cast 2.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 699, fig. 2.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1910, p. 83.—Ruedemann, Pal. Univ., 4th ser., fasc. 1, 1912, p. 233. Ordovician(?): Hampshire, Virginia (=Hampshire County, West Virginia).

Observation.—Of the numerous references to this species, the above only refer directly to Green's types, which are lost. Green's cast of the type can not be identified with any of the species of *Calymene* and the name might as well be abandoned.

CALYMENE CALLICEPHALA GRANULOSA Foerste. See *Calymene granulosa*.

Calymene camerata Conrad.

Calymene camerata Conrad, Jour. Acad. Nat. Sci. Philadelphia, 1st ser., 8, 1842, p. 278.—Hall, Pal. New York, 2, 1852, p. 337, pl. 78, figs. 1a-1f.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 250, pl. 22, figs. 22-25.—Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 494, pl. 89, fig. 9.

Cayuga (Cobleskill): Schoharie, New York.

Helderbergian: Cash Valley, Devils Backbone, Maryland; Keyser, West Virginia (Keyser); Nearpass Quarry, New Jersey (Decker Ferry).

CALYMENE CHRISTYI Hall. See *Synhomalonotus christyi*.

Calymene clintoni (Vanuxem).

Hemicrypturus clintonii Vanuxem, Geol. New York, pt. 3, 1842, p. 79, fig. 2. *Hemicrypturus* tail Hall, Geol. New York, pt. 4, 1843, p. 77, tab. org. rem., 9, fig. 2.

Calymene blumenbachii? var. *senaria* Hall, Pal. New York, 2, 1852, p. 299, pl. A 66, figs. 6a-6e.

Calymene clintoni Hall, Pal. New York, 2, 1852, p. 298, pl. A 66, figs. 5a-5d.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 823, fig. 637.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 109, figs.—Foerste, Cincinnati Soc. Nat. Hist., Jour. 21, 1909, p. 33, pl. 1, fig. 6.

Clinton: Herkimer and Cayuga Counties, New York; Kentucky, etc.

CALYMENE CLINTONI Vogdes. See *Calymene vogdesi*.

Calymene conradi Emmons.

Not recognized.

Calymene conradi Emmons, Amer. Geol., 1, pt. 2, 1855, p. 236.—Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 320.

Lorraine shales: New York.

Observation.—Probably refers to the species or variety of *Calymene* occurring at this horizon.

CALYMENE CRASSIMARGINATUS Hall. See *Proetus crassimarginatus*.

Calymene diops Green.

Calymene diops Green, Mon. Tril. N. A., 1832, p. 37, cast No. 8, fig. 2.

Ordovician?: Horizon and locality unknown.

Observation.—Not recognized. Possibly a *Phacops*.

Calymene dubia Savage.

Calymene dubia Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 60, pl. 2, figs. 8, 9.

Upper Medinan (Girardeau): Alexander County, Illinois.

Calymene fayettensis Slocum.

Calymene fayettensis Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, No. 3, 1913, p. 67, pl. 16, figs. 8, 9.

Richmond (Maquoketa): Clermont, Elgin, and Bloomfield, Iowa.

Calymene gracilis Slocum.

Calymene gracilis Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, No. 3, 1913, p. 69, pl. 18, fig. 9.

Richmond (Maquoketa): Pattersons Springs, near Brainard, Iowa.

Calymene granulosa (Foerste).

Calymene callicephala granulosa Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 294.

Eden: Cincinnati, Ohio, and vicinity; New York (Indian Ladder).

Calymene macrophthalma D'Orbigny.

Calymene macrophthalma D'Orbigny, Voyage l'Amerique Merid., 3, pt. 4, 1847, p. 32, 8, Atlas, pl. 1, figs. 6, 7.

Silurian: Rio Grande, Bolivia.

Calymene mammillata Hall.

Calymene mammillata Hall, Geol. Surv. Wisconsin, 1861, p. 50; Geol. Wisconsin, 1, 1862, p. 432, figs. 1, 2.

Richmond (Maquoketa): Maquoketa Creek, twelve miles west of Dubuque, Iowa.

Calymene meeki Foerste.

Calymene senaria Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 173, pl. 14, figs. 14a-f.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 140.—White, 2d Ann. Rep. Indiana Dep. Stat. Geol., 1880, p. 493, pl. 2, figs. 1, 2.

Calymene callicephala Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1057, pl. 54, figs. 6-6c.—Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, pl. 14, figs. 16, 17.

Calymene meeki Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 84, pl. 3, fig. 18.—Raymond, Zittel-Eastman Textb. Pal. 1913, p. 724.

Mayesville and Richmond: Cincinnati, Ohio, and vicinity; Kentucky; Indiana; Tennessee; etc.

Calymene meeki retrorsa Foerste.

Calymene meeki-retrorsa Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 85, pl. 3, fig. 19.

Richmond (Waynesville): Near Dunlapsville, Indiana.

CALYMENE MICRIPS Green. See *Pterygometopus microps*.**Calymene multicosta** Hall.

Calymene multicosta Hall, Pal. New York, 1, 1847, p. 228, pl. 69, fig. 3; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 67.—Brainerd and Seely, Bull. Amer. Mus. Nat. Hist., 1890, 3, p. 22.

Calymene multicosta—Continued.

"Birdseye": Ile la Motte, Lake Champlain, Vermont.

Observation.—Not recognized. Possibly the same as *Pliomerops canadensis*, but original is too poorly preserved to decide.

CALYMENE NASUTA Ulrich. See *Calymenella nasuta*.

Calymene niagarensis Hall.

Calymene niagarensis Hall, Geol. New York, pt. 4, 1843, p. 102, fig. 3, p. 101, tab. org. rem., 10, fig. 3.—Owen, Amer. Jour. Sci. Arts, 48, 1845, p. 309, fig. 3.—Hall, Canadian Nat. Geol., 5, 1860, p. 156; Trans. Albany Inst., 4, 1863, p. 227; adv. sheets 18th Rep. New York State Cab. Nat. Hist., 1865, p. 30; 20th Rep., rev. ed., 1870, p. 425.—Hall and Whitfield, Pal. Ohio, 2, 1875, p. 153, pl. 6, figs. 14, 15.—Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 32, figs. 8–15; mus. ed., 1879, p. 187, pl. 32, figs. 8–15; 11th Rep. Dep. Geol. Nat. Hist. Indiana, 1882, p. 331, pl. 34, figs. 8–15.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 195, fig.—Hall and Clarke, Pal. New York, 7, 1888, pl. 1, figs. 10–14.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 109, fig.—Keyes, Geol. Surv. Missouri, 4, 1894, pl. 32, fig. 5.—Van Ingen, School of Mines Quart., 23, 1901, p. 35.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903 (p. 2), p. 107, pl. 21, fig. 12.—Whiteaves, Geol. Surv. Canada, Ann. Rep., n. s., 14, 1904, App. F, p. 57; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 269.—Rowley, Green's Contr. Indiana Pal., 2, pt. 2, 1906, p. 27, pl. 5, fig. 26.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, 1907, p. 261, pl. 23, figs. 9, 10.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 34.—Grabau and Shimer, N. A. Index Fossila, 2, 1910, p. 315, fig. 1628.

Calymene Blumenbachii Chapman, Canadian Jour., n. s., 8, 1863, p. 31, fig. 147; p. 206, fig. 209.—Roemer, Sil. Fauna West Tennessee, 1860, p. 79, pl. 5, fig. 22.—Billings, Cat. Sil. Foss. Anticosti, Acad. Geol., 2d ed., 1868, p. 607.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 109, fig.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 2, 1895, p. 106.

Calymene blumenbachii var. *niagarensis* Hall, Pal. New York, 2, 1852, p. 307, pl. 67, figs. 11–12 (see for earlier synonymy); Geol. Surv. Wisconsin, 1, 1862, p. 432; 20th Rep. New York State Cab. Nat. Hist., 1867, p. 334.—Grabau, Bull. New York State Mus., 45, 1901, p. 224, fig. 156.

Calymene sp. Hall, Pal. New York, 2, 1852, p. 350, pl. 83, fig. 8.

Brassfield-Cayugan: Lockport, Rochester, etc., New York. Wide distribution in the United States and Canada, especially in the Niagara.

CALYMENE PHLYCTAINOIDES Green. See *Corydocephalus phlyctainoides*.

Calymene platycephala Foerste.

Calymene platycephala Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 81, pl. 2, fig. 7; pl. 3, fig. 21.

Trenton (Saltillo): Clifton, Tennessee.

CALYMENE ROSTRATA Vogdes. See *Calymenella rostrata*.

Calymene rugosa Shumard.

Calymene rugosa Shumard, 1st and 2d Reps. Geol. Missouri, 1855, p. 200, pl. B, fig. 14.—Keyes, Missouri Geol. Surv., 4, 1895, p. 233.

Helderbergian(?): One mile below Birmingham, Missouri.

CALYMENE SELENECEPHALA Green. See *Calymene senaria*.

CALYMENE SENARIA Meek. See *Calymene meeki*.

Calymene senaria Conrad.

Calymene blumenbachii Green, Mon. Tril. N. A., 1832, p. 28, cast 1.

Calymene selenicephala Green, Mon. Tril. N. A., 1832, p. 31, cast 3.—Edwards, Hist. Nat. Crust., 3, 1840, p. 320.

Calymene senaria Conrad, 5th Ann. Rep. Geol. Surv. New York, 1841, pp. 38, 49.—

Emmons, Nat. Hist. New York, Geol., 2, 1842, p. 390, fig. 2.—Vanuxem, *ibid.*,

3, 1842, pp. 48, 55.—Owen (Emmons), Amer. Jour. Sci., 47, 1844, pp. 363,

364, fig. 2.—Hall, Pal., New York, 1, 1847, p. 238, pl. 64, figs. 3a-n.—Emmons,

Amer. Geology, 1, pt. 2, 1855, p. 213, pl. 15, fig. 16; p. 216, fig. 9.—Billings,

Canadian Nat. Geol., 1, 1856, p. 46, fig. 10.—Emmons, Man. Geol., 1860, p.

98, fig. 87.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 3,

fig. 8.—Hitchcock, Geol. Vermont, 1, 1861, p. 300, fig. 213.—Salter, Mon.

Brit. Tril., Pal. Soc., 1865, p. 97, pl. 9, figs. 5-11.—Billings, Quart. Jour. Geol.

Soc. London, 26, 1870, p. 485, pl. 32, figs. 3-5.—Walcott, 28th Rep. New York

State Mus. Nat. Hist., doc. ed., 1877, pp. 89-91; Mus. ed., 1879, pp. 89-91.—

Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 591.—Emerson,

Narrative Hall's 2d Arctic Exped., U. S. Navy Dep., 1879, p. 582 (loc. occ.).—

Walcott 31st Rep. New York State Mus. Nat. Hist., 1879, p. 61, pl. 1, figs.

1, 2, 5; Bull. Mus. Comp. Zool., 8, 1881, pp. 198-216, pl. 1, figs. 6-10; pl. 2,

figs. 5, 7, 10; pl. 3, figs. 1, 3, 8-10; pl. 4, fig. 3; pl. 5, figs. 1-6; pl. 6, figs. 1, 2.—

Chamberlin, Geol. Wisconsin, 1, 1883, p. 160, fig.—Walcott, Science, 3, 1884,

pp. 279, 281, figs. 2, 3; Notes on some sections of Tril., 1887, pl. 1.—Clarke,

Jour. Morph., 2, 1888, p. 254, footnote; p. 266, footnote.—Lesley, Geol. Surv.

Pennsylvania, Rep. P 4, 1889, p. 110, figs.—Clarke, Geol. Minnesota, 3, pt. 2,

1894, p. 700, fig. 3.—Keyes, Geol. Surv. Missouri, 4, 1894, p. 230.—Bernard,

Quart. Jour. Geol. Soc. London, 1894, 50, p. 427, figs. 13, 15.—Walcott, Geol.

Mag., dec. 4, 1, 1894, p. 247, pl. 8, figs. 7-10; Proc. Biol. Soc. Washington, 9,

1894, p. 90, pl. 1, figs. 7-10.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt.

3, 1897, p. 231.—Pompeckj, N. Jahrb. Min., 1, 1898, pp. 197, 198 (footnote),

244, 246.—Ruedemann, Bull. New York State Mus., 49, 1901, p. 67.—Beecher,

Amer. Jour. Sci., 4th ser., 13, 1902, pl. 5, fig. 7.—Beecher, Geol. Mag., dec. 4,

9, 1902, p. 158, fig. 4.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 203,

pl. 15, fig. 23.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 315, fig.

1624c, d.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1910, p. 82, pl. 2, fig.

14.—Ruedemann, Bull. New York State Mus., 162, 1912, p. 120, pl. 9, figs. 6-10,

Calymene blumenbachii var. *senaria* Hall, Pal. New York, 2, 1852, p. 299, pl. 66a, figs. 6a-e.

Trenton: New York, New Jersey, Ohio, Minnesota, etc.

Plastotypes.—Cat. Nos. 4916, 5004, U.S.N.M.

CALYMENE SPINIFERA Conrad. See *Cyphaspis girardeauensis*.

CALYMENE? TRISULCATA Hall. See *Phacops trisulcatus*.

Calymene verneuilli D'Orbigny.

Calymene Verneuilli D'Orbigny, Voyage l'Amerique Merid., 3, pt. 4, 1847, p. 31,

8, Atlas, pl. 1, figs. 4, 5.

Silurian: Chuquisaca, Bolivia.

Calymene vogdesi Foerste.

Calymene clintoni Vogdes (not Vanuxem) Proc. Acad. Nat. Sci. Philadelphia,

1880, p. 178, figs. 3, 4; Pal. Cont., 1, 1881, p. 9, figs. 3-7; Desc. New Crust.

Clint. of Georgia, etc., 1886, p. 6, figs. 3-4.

Calymene blumenbachii? Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 110, pl. 13, fig. 25.

Calymene vogdesi—Continued.

Calymene blumenbachii var. *vogdesi* Foerste, Proc. Bost. Soc. Nat. Hist., 1890, 24, p. 265.

Calymene blumenbachii (or *senaria*) Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 55, pl. 8, fig. 1.

Calymene — Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 109, pl. 13, fig. 24.

Calymene vogdesi Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 95, pl. 8, figs. 12-16; Geol. Surv. Ohio, 7, 1895, p. 526, pl. 25, figs. 24-25; pl. 27, figs. 12-16.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 315.

Upper Medinan (Brassfield): Catoosa Station, etc., Georgia; Centerville, Dayton, etc., Ohio; Indiana.

CALYMENELLA Bergeron.

Genotype: *C. boisseli* Bergeron.

Calymenella Bergeron, Bull. Soc. Geol. France, 3d ser., 18, 1890, p. 367.

Calymenella nasuta (Ulrich).

Calymene nasuta Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 131, figs. 1-3, p. 132.

Calymenella nasuta Pompeckj, Neues Jahrb. Min., Geol. Pal., 1, 1898, p. 243.

Clinton (Osgood): Osgood, Indiana.

Cotype.—Cat. No. 41871, U.S.N.M.

Calymenella rostrata (Vogdes).

Calymene rostrata Vogdes, Amer. Jour. Sci., 3d ser., 18, 1879, p. 477; Proc. Acad. Nat. Sci. Philadelphia, 1880, p. 176, figs. 1-2; Pal. Cont., 1, 1881, p. 8, pl., figs. 1, 2; Desc. New Crust. Clint. of Georgia, etc., 1886, p. 2, 4, figs. 1-2.—Foerste, Proc. Bost. Soc. Nat. Hist., 24, 1890, p. 267.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 315.

Calymenella rostrata Pompeckj, Neues Jahrb. Min., Geol. Pal., 1, 1898, p. 243.

Clinton: Catoosa Station, Georgia; New York.

CALYPTOGRAPTUS Spencer.

Genotype: *C. cyathiformis* Spencer.

Calyplograptus Spencer, Canadian Nat., n. s., 8, 1878, p. 459.—Lapworth, Quart. Jour. Geol. Soc. London, 37, 1881, p. 173.—Spencer, Proc. Amer. Assoc. Adv. Sci., 31, 1883, p. 364; Bull. Mus. Univ. State Missouri, 1, 1884, p. 27; Trans. Acad. Sci. St. Louis, 4, 1884, p. 562, 577.—Miller, N. A. Geol. Pal., 1889, p. 175.—Gurley, Jour. Geol., 4, 1896, pp. 93, 308.

CALYPTOGRAPTUS? *ARBUSCULUS* Spencer. See *Dictyonema arbuscula*.

Calyplograptus cyathiformis Spencer.

Calyplograptus cyathiformis Spencer, Canadian Nat., n. s., 8, 1878, p. 459; Trans. Acad. Sci. St. Louis, 4, 1884, p. 578, pl. 3, fig. 3; Bull. Mus. Univ. State Missouri, 1, 1884, p. 28, pl. 3, fig. 3.—Miller, N. A. Geol. Pal., 1889, p. 175, fig. 145.—Gurley, Jour. Geol., 1896, pp. 93, 308.—Baesler, Bull. U. S. Nat. Mus., 1909, 65, pp. 38, 39, fig. 48.

Niagaran dolomite: Hamilton, Ontario.

Calyplograptus micronematodes Spencer.

Calyplograptus micronematodes Spencer, Canadian Nat., 10, 1882, p. 165 (*nom. nud.*); Trans. Acad. Sci. St. Louis, 4, 1884, p. 579, pl. 3, figs. 4, 4a; Bull. Mus. Univ. State Missouri, 1, 1884, p. 29, pl. 3, figs. 4, 4a.—Gurley, Jour. Geol., 4, 1896, pp. 93, 308.—Baesler, Bull. U. S. Nat. Mus., 65, 1909, pp. 39, 40, figs. 49, 50.

Niagaran dolomite: Hamilton, Ontario.

***Calyptograptus? radiatus* Spencer.**

Calyptograptus radiatus Spencer, Canadian Nat., 10, 1882, p. 165 (nom. nud.);
Trans. Acad. Sci., St. Louis, 4, 1884, p. 580, pl. 4, fig. 3; Bull. Mus. Univ.
State Missouri, 1, 1884, p. 30, pl. 4, fig. 3.—Gurley, Jour. Geol., 4, 1896, pp.
93, 308.—Baesler, Bull. U. S. Nat. Mus., 65, 1909, p. 40, fig. 51.

Niagaran dolomite: Hamilton, Ontario.

CALYPTOGRAPTUS SUBRETIFORMIS Spencer. See *Dictyonema subretiforme* and *D. polymorphum*.

CAMARELLA Billings.

Genotype: *C. volborthi* Billings.

Camarella Billings, Canadian Nat. Geol., 4, 1859, p. 301; 6, 1861, p. 316.—Zittel, Handb. Pal., 1, 1880, p. 692.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th ser., 1, 1883, p. 412.—Walcott, Bull. U. S. Geol. Surv., 30, 1886, p. 122.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 48.—Miller, N. A. Geol. Pal., 1889, p. 338; 2d App., 1897, p. 759.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 219; 13th Ann. Rep. New York State Geol., 1895, p. 838.—Koken, Die Leitfossilien, Leipzig, 1896, p. 244.—Huene, Verh. d. Russ.-Kais. Mineral Gesell. zu St. Petersburg, 38, 1900, p. 228, fig. 1.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 321.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 271.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 394.

***Camarella ambigua* (Hall).**

Atrypa ambigua Hall, Pal. New York, 1, 1847, p. 143, pl. 33, figs. 8, 9.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 190, pl. 10, figs. 8, 9, 8c.

Triplexia? ambigua Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 65.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1224, figs.

Camarella ambigua Miller, Amer. Pal. Foss., 1879, p. 107.

Trenton: Middleville, New York.

CAMARELLA BERNENSIS Sardeson. See *Parastrophia hemiplicata*.

CAMARELLA BISULCATA Miller. See *Cyclospira bisulcata*.

***Camarella breviplicata* Billings.**

Camarella breviplicata Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 304, fig. 295.

Canadian (Beekmantown): Stanbridge, Quebec.

CAMARELLA CALCIFERA Billings. See *Syntrophia calcifera*.

CAMARELLA CONGESTA Nettelroth. See *Hyattidina congesta*.

***Camarella(?) costata* Billings.**

Camarella? costata Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 305, fig. 296.

Canadian (Beekmantown): Stanbridge, Quebec.

CAMARELLA EXTANS Lesley. See *Triplexia extans*.

CAMARELLA HEMPLICATA Billings. See *Parastrophia hemiplicata*.

***Camarella inornata* Weller.**

Camarella inornata Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 157, pl. 10, figs. 8-10.

Black River (Jacksonburg): Hainesburg, New Jersey.

CAMARELLA LENTICULARIS Billings. See *Parastrophia lenticularis*.

Camarella longirostris Billings.

Camarella longirostra Billings, Canadian Nat. Geol., 4, 1859, p. 302; p. 445, fig. 23; Geol. Canada, 1863, p. 127, fig. 53.—Raymond, Ann. Carnegie Mus., 7, 1911, p. 249, pl. 36, figs. 29, 30.

Triplecia gracilis Raymond, Bull. Amer. Pal., 3, 1902, p. 303, pl. 18, fig. 1.

Chazyan: Mingan Islands, Canada (Mingan); Crown Point, Valcour Island, Chazy, and Valcour, New York (Day Point, Valcour); East Tennessee (Lenoir).

CAMARELLA NUCLEUS Lesley. See *Triplecia nucleus*.

CAMARELLA OPS Billings. See *Parastrophia ops*.

CAMARELLA OWATONNENSIS Sardeson. See *Cyclospira bisulcata*.

Camarella panderi Billings.

Camarella panderi Billings, Canadian Nat. Geol., 4, 1859, p. 302; Geol. Canada, 1863, p. 143, fig. 78.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 220, pl. 62, figs. 19–23.—Raymond, Ann. Carnegie Mus., 7, 1911, p. 250, pl. 36, figs. 31, 32.

Black River (Leray): Pauquettes Rapids, Ottawa River, Canada; Curdsville, Kentucky.

Camarella parva Billings.

Camarella parva Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 219.—Mathew, Trans. Royal Soc. Canada, 11, 1893, p. 103, pl. 7, fig. 9.

Chazyan (Quebec—N, P): Table Head and four miles northeast Portland Creek, Newfoundland.

Canadian (Bretonian—Div. C 3a): St. John, New Brunswick.

Camarella polita Billings.

Camarella polita Billings, Pal. Foss., 1 Geol. Surv. Canada, 1865, pp. 304, 305, fig. 297.

? Canadian (Beekmantown): Stanbridge and Island of Orleans, Quebec.

Camarella varians Billings.

Camarella varians Billings, Canadian Nat. Geol., 4, 1859, p. 445, fig. 24; Geol. Canada, 1863, p. 127, fig. 52; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 220.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 271, fig. 328.—Raymond, Ann. Carnegie Mus., 7, 1911, p. 250, pl. 36, figs. 19–27, 33–36.

Chazyan: Mingan Islands, Gulf of St. Lawrence (Mingan); Table Head, four miles northeast Portland Creek, and south side of Cow Point, Newfoundland (Quebec N, P); Crown Point, Valcour Island, Plattsburg, Chazy, etc., New York (Crown Point, Valcour), East Tennessee (Lenoir).

Camarella volborthi Billings.

Camarella volborthi Billings, Canadian Nat. Geol., 4, 1859, p. 301; Geol. Canada, 1863, p. 143, fig. 77.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 220, pl. 62, figs. 11–18; pl. 84, fig. 42.—Miller, N. A. Geol. Pal., 1889, p. 338, fig. 546.

Black River (Leray): Pauquettes Rapids, Ottawa River, Canada.

CAMARIUM Hall. See *Merista Suess*.

CAMARIUM ELONGATUM Hall. See *Merista typa*.

CAMARIUM TYPUM Hall. See *Merista typa*.

CAMAROCLADIA Ulrich and Everett.

Genotype: *C. dichotoma* Ulrich and Everett.

Camarocladia Ulrich and Everett in Miller, N. A. Geol. Pal., 1889, p. 156; Geol. Surv. Illinois, 8, 1890, p. 230.

***Camarocladia dichotoma* Ulrich and Everett.**

Camarocladia dichotoma Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 281, pl. 7, figs. 1, 1a, b.

Black River (Platteville): Near Dixon, Illinois.

Sections of *cotypes*.—Cat. No. 46549, U.S.N.M.

***Camarocladia rugosa* Ulrich.**

Camarocladia rugosa Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. xcv, footnote.

Black River (Decorah): Mercer County, Kentucky; Goodhue County, Minnesota.

Cotypes.—Cat. No. 49833, U.S.N.M.

CAMAROCEINUS Hall.

Genotype: *C. stellatus* Hall.

Camarocerinus Hall, 28th Rep. New York State Mus. Nat. Hist., 1879, pp. 205-6; ext., with additions, 1880, pp. 3-5.—Zittel, Grundzuge Pal., 1895, p. 154.—Zittel-Eastman, Textb. Pal., 1896, p. 183.—Haeckel, Die Amphorideen Cystoideen, Leipzig, 1896, pp. 168, 169.—Barrande and Waagen, Syst. Sil. du Centre Boheme, 7, pt. 1, 1897, p. 1.—Bather, Treatise on Zool., 3, Echinodermata, 1900, pp. 77, 136, 161.—Foerste, Jour. Geol., 11, pp. 683-685.—Schuchert, Smiths. Misc. Coll., 47, p. 253.

***Camarocerinus stellatus* Hall.**

Camarocerinus stellatus Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 207, pl. 35, figs. 1-8; ext., 1880, p. 5, pl. 35, figs. 1-8.—Schuchert, Smiths. Misc. Coll., 47, 1904, p. 269, pl. 44, figs. 1-5; Maryland Geol. Surv., Low. Dev., 1913, p. 227, pl. 31, figs. 1-5.

Helderbergian: Schoharie, New York (Manlius transition bed); Keyser, West Virginia; Devils Backbone, near Cumberland, Maryland (Keyser).

Plesiotypes.—Cat. No. 35080, U.S.N.M.

CAMAROTÆCHIA Hall and Clarke.

Genotype: *Atrypa congregata* Conrad.

Camarotæchia Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 189; 13th Ann. Rep. New York State Geol., 1895, p. 826.—Girty, Mon. U. S. Geol. Surv., 32, pt. 2, 1899, p. 538.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 229.—Williams, Bull. U. S. Geol. Surv., 165, 1900, p. 59.—Schuchert, Zittel-Eastman, Textb. Pal., 1, 1900, p. 324.—Grabau, Bull. New York State Mus., 45, 9, 1901, p. 192; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 190.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 283.—Raymond, Ann. Carnegie Mus., 7, 1911, p. 219.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 397.

Stegerhynchus Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 98.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 397 (Genotype: *Camarotæchia whitei* Hall).

***Camarotæchia(?) acinus* (Hall).**

Rhynchonella acinus Hall, Trans. Albany Inst., 4, 1863, p. 215; 28th Rep. New York State Mus. Nat. Hist., 1879, p. 163, pl. 26, figs. 7-11; 11th Rep. State Geol. Indiana, 1882, p. 306, pl. 26, figs. 7-11.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 73, pl. 26, figs. 6, 13, 14, pl. 32, figs. 13-16.—Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 35, pl. 4, figs. 9-11.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 882, figs.

Camarotæchia? acinus Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 190.—Grabau, Bull. New York State Mus., 45, 1901, p. 193, fig. 108; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 193, fig. 108.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 284, figs. 347, 348.

Camarotæchia cf. *acinus* Kindle and Breger, 28th Ann. Rep. Nat. Res. Indiana, 1904, p. 439, pl. 8, figs. 1, 2.

Camarotoechia(?) acinus—Continued.

Niagaran: Waldron, etc., Indiana; Newsom, etc., Tennessee (Waldron); Louisville, Kentucky (Louisville); Pendleton, Indiana; etc.

Plesiotypes.—Cat. No. 51366, U.S.N.M. (Nettelroth).

Camarotoechia(?) acinus convexa (Foerste).

Rhynchonella acinus var. convexa Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 318, pl. 6, fig. 13; Geol. Ohio, 7, 1895, p. 593, pl. 31, fig. 13.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 164.

Upper Medinan (Brassfield): Hanover, Indiana.

Camarotoechia acinus subrhomboidea Foerste.

Camarotoechia acinus-subrhomboidea Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 12, pl. 2, fig. 4.

Clinton (West Union): Near Martins, Lewis County, Kentucky.

Camarotoechia sequiradiata (Hall).

Atrypa equiradiata Hall, Pal. New York, 2, 1852, p. 70, pl. 23, fig. 5.

Rhynchospira? equiradiata Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 77.

Rhynchonella sequiradiata Miller, N. A. Geol. Pal., 1889, p. 367.

Camarotoechia sequiradiata Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 190.

Protorhyncha sequiradiata Hall and Clarke, *ibid.*, 1895, pl. 56, figs. 7-9.

Clinton: Oneida County, New York; Arisaig, Nova Scotia.

CAMAROTECCHIA ALTLIS Hall and Clarke. See Camarotoechia plena.**Camarotoechia? antiqua Savage.**

Camarotoechia? antiqua Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 82, pl. 5, figs. 1, 2.

Upper Medinan (Edgewood): Alexander County, Illinois, and near Edgewood, Missouri.

Camarotoechia argentea (Billings).

Rhynchonella? argentea Billings, Cat. Sil. Foss. Anticosti, 1866, p. 43.

Anticostian (Jupiter River): East of Otter River, Anticosti.

Camarotoechia(?) coalescens Whiteaves.

Camarotoechia(?) coalescens Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 272, pl. 25, fig. 7.

Niagaran: Winisk River, Canada.

Camarotoechia? concinna Savage.

Camarotoechia? concinna Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 81, pl. 5, figs. 4, 5.

Upper Medinan (Edgewood): Pike County, Missouri, and near Thebes, Illinois.

Camarotoechia congruens Foerste.

Camarotoechia congruens Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 11, pl. 2, fig. 3A, B.

Clinton (Crab Orchard and West Union): Near Martins, etc., Lewis County, Kentucky.

Camarotoechia decemplicata (Sowerby).

Terebratula decemplicata Sowerby, Sil. Syst., 1839, pl. 21, fig. 17.

Rhynchonella decemplicata Davidson, Mon. Brit. Foss. Brach., 3, pt. 7, 1871, p. 177, pl. 23, figs. 20-24.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 320, pl. 6, figs. 23, 24.

Camarotoechia decemplicata—Continued.

Rhynchonella Eva Billings, Cat. Sil. Foss. Anticosti, 1866, p. 44.

Anabaia anticostiana Clarke, Archiv. Mus. Nac. Rio de Janeiro, 10, 1899, Eng. ed., p. 15, pl. 1, figs. 26-28.

Camarotoechia decemplicata Twenhofel, Bull. Victoria Mem. Mus., 3, 1914, p. 28. Silurian: England; Cumberland Gap, Tennessee (Clinton); Anticosti (Gun River).

Camarotoechia ekwanensis Whiteaves.

Camarotoechia Ekwanensis Whiteaves, Ann. Rep. Geol. Surv. Canada, n. s., 14, App. F, 1904, p. 42; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 252, pl. 25, figs. 4, 4b.

Niagaran: Ekwan River, and Southampton Island, Canada.

Camarotoechia? festinata Savage.

Camarotoechia? festinata Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 50, pl. 1, figs. 24-26.

Upper Medinan (Girardeau): Thebes, Illinois.

Camarotoechia fringilla (Billings).

Rhynchonella fringilla Billings, Pal. Foss., 1, 1865 (adv. sheets, 1862), p. 141, fig. 118.

Camarotoechia fringilla Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 190, pl. 56, figs. 28-30.

Anticostian (Gun River): Gull Cape, Anticosti.

Camarotoechia gigantea Maynard.

Camarotoechia gigantea Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 354, pl. 63, figs. 15, 16.

Helderbergian (Keyser): Devils Backbone, near Cumberland and Cash Valley, Maryland.

Camarotoechia glacialis (Billings).

Rhynchonella glacialis Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 143, fig. 120 (adv. sheets, 1862).

Camarotoechia glacialis Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 190.

Anticostian (Gun River and Jupiter River): Gull Cape, etc., Anticosti.

Camarotoechia hudsonica Grabau.

Camarotoechia hudsonica Grabau, Bull. New York State Mus., 69, 1903, p. 1048, fig. 8; 92, 1906, p. 115.

Helderbergian (Decker Ferry—"Manlius"): Becraft Mountain, near Hudson, New York.

Camarotoechia hydraulica (Whitfield).

Rhynchonella hydraulica Whitfield, Ann. New York Acad. Sci., 2, 1882, p. 194; Ibid., 5, 1891, p. 512, pl. 5, fig. 17; Geol. Ohio, 7, 1895, p. 414, pl. 1, fig. 17.—Sherzer, Geol. Surv. Michigan, 7, pt. 1, 1900, pl. 17, fig. 17.

Camarotoechia hydraulica Grabau, Michigan Geol. Surv., Geol. Ser. 2, 1909, p. 128, pl. 30, fig. 17.

Lower Monroan (Greenfield): Greenfield, Ohio.

Camarotoechia(?) indianensis (Hall).

Rhynchonella indianensis Hall, Trans. Albany Inst., 4, 1863, p. 215; 28th Rep. New York State Mus. Nat. Hist., 1879, p. 163, pl. 26, figs. 12-22; 11th Rep. State Geol. Indiana, 1882, p. 306, pl. 26, figs. 12-22; pl. 27, figs. 4-6.—Nettelroth, Kentucky, Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 76, pl. 33, figs. 18-20.—Beecher and Clarke, Mem. New York State Mus. 1, 1889, p. 42, pl. 3, figs. 17-28.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 890, figs.

Camarotoechia(?) indianensis—Continued.

- Camarotoechia(?) indianensis* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 166.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 46, pl. 4, figs. 26, 27.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 284, fig. 348.
- Niagaran: Waldron, Indiana; Newsom, Tennessee (Waldron); Louisville, Kentucky (Louisville); Shelby and Rochester, New York (Guelph); Wisconsin (Racine); Osgood, Indiana (Osgood); etc.
- Plesiotype*.—Cat. No. 51330, U.S.N.M. (Nettelroth).

Camarotoechia lamellata (Hall).

- Atrypa lamellata* Hall, Pal. New York, 2, 1852, p. 329, pl. 74, fig. 11.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 237, pl. 21, figs. 23–29.
- Rhynchonella lamellata* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 78.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 359; Amer. Geol., 31, 1903, p. 167, figs.
- Camarotoechia lamellata* Grabau, Bull. New York State Mus., 92, 1906, p. 109, fig. 13.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 286, fig. 349.—Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 352, pl. 63, figs. 9, 10.
- Cayugan (Cobleskill): Schoharie, New York.
- Helderbergian: Pinto, Cumberland, and Cash Valley, Maryland (Keyser); New Jersey (Decker Ferry).

Camarotoechia leightoni Williams.

- Camarotoechia leightoni* Williams, Proc. U. S. Nat. Mus., 45, 1913, p. 333, pl. 30, figs. 9, 11, 12, 13.
- Silurian (Pembroke): Leighton Cove, Washington County, Maine.
- Cotypes*.—Cat. Nos. 58962, 58963, U.S.N.M.

Camarotoechia lindenensis Foerste.

- Camarotoechia lindenensis* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 98, pl. 1, fig. 13.
- Niagaran (Brownsport): Near Linden, Tennessee.

Camarotoechia litchfieldensis (Schuchert).

- Atrypa* sp. Hall, Pal. New York, 2, 1852, p. 330, pl. 74, figs. 11 and 12.
- Rhynchonella(?) litchfieldensis* Schuchert, Amer. Geol., 31, 1903, p. 167, figs.
- Camarotoechia litchfieldensis* Grabau, Bull. New York State Mus., 92, 1906, p. 109, fig. 14.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 286, fig. 350.—Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 353, pl. 63, figs. 11–14.
- Rhynchonella agglomerata* Weller, Geol. Surv. New Jersey, Pal. 3, 1903, pp. 234–235, pl. 21, figs. 5–11.
- Cayugan (Cobleskill): Schoharie Valley, New York.
- Helderbergian: Keyser, West Virginia; Maryland (Keyser); New Jersey (Decker Ferry).

Camarotoechia litchfieldensis angustata Høltedahl.

- Camarotoechia litchfieldensis angustata* Høltedahl, 2d Arctic Expl. "Fram," 1898–1902, No. 32, 1914, p. 22, pl. 8, fig. 1.
- Helderbergian (Lower beds): Near Borgen, Southwest Ellesmereland, Arctic America.

Camarotoechia major Raymond.

- Camarotoechia major* Raymond, Amer. Jour. Sci., 4th ser., 20, 1905, p. 369; Ann. Carnegie Mus., 7, 1911, p. 226, pl. 34, figs. 11–14.
- Chazyan (Valcour): Cystid Point, Valcour Island, New York.

Camarotoechia (Stegerhynchus) neglecta (Hall).

Atrypa neglecta Hall, Pal. New York, 2, 1852, p. 70. pl. 23, fig. 4; p. 274, pl. 57, fig. 1.—Billings, Canadian Nat. Geol., 1, 1856, p. 138, pl. 2, figs. 11, 12.

Rhynchonella neglecta Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 78.—Billings, Geol. Canada, 1863, p. 315, fig. 325.—Hall, Trans. Albany Inst., 4, 1863, p. 226.—Meek, Pal. Ohio, 1, 1873, p. 179, pl. 15, fig. 3.—Hall and Whitfield, *ibid.* 2, 1875, p. 134, pl. 7, fig. 15.—Hall, 28th Rep. New York State Mus. Nat. Hist., 1879, p. 162, pl. 26, figs. 1-6; 11th Rep. State Geol. Indiana, 1882, p. 305, pl. 26, figs. 1-6; pl. 27, fig. 3.—Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 37, pl. 4, figs. 3, 6-8.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 317, pl. 6, fig. 12.

Rhynchonella (Stenoechisma) neglecta Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 894, figs.

Rhynchonella neglecta var. *scobina* Meek, Amer. Jour. Sci., 3d ser., 4, 1872, p. 277.

Rhynchonella scobina Hall and Whitfield, Pal. Ohio, 2, 1875, p. 116.—Foerste, Geol. Ohio, 7, 1895, p. 592.

Camarotoechia? neglecta Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 190.—Grabau, Bull. New York State Mus., 45, 1901, p. 193, fig. 107; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 193, fig. 107.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 234, fig. 346.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 45, pl. 4, figs. 28-31.

Niagaran: Reynales Basin, Lockport, etc., New York (Clinton); Hamilton, Ontario; Dayton and Cedarville, Ohio; Hanover Indiana Wisconsin; Arisaig, Nova Scotia; etc.

Camarotoechia (Stegerhynchus) neglecta cliftonensis Foerste.

Rhynchonella (Stegerhynchus) neglecta-cliftonensis Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 97, pl. 3, figs. 48 A, B, C.

Upper Medinan (Brassfield): Clifton, Tennessee.

Camarotoechia nutrix (Billings).

Rhynchonella nutrix Billings, Cat. Sil. Foss. Anticosti, 1866, p. 43.

Gamachian (Ellis Bay) and Anticostian (Gun River, Jupiter River): Gamache Bay, etc., Anticosti.

Camarotoechia obtusiplicata (Hall).

Atrypa obtusiplicata Hall, Pal. New York, 2, 1852, p. 279, pl. 58, fig. 2.

Rhynchonella obtusiplicata Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 78.

Camarotoechia obtusiplicata Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 190.—Grabau, Bull. New York State Mus., 45, 1901, p. 193, fig. 106; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 193, fig. 106.

Clinton: Lockport, etc., New York (Rochester); Arisaig, Nova Scotia.

Camarotoechia orientalis (Billings).

Rhynchonella orientalis Billings, Canadian Nat. Geol., 4, 1859, p. 443, fig. 21; Geol. Canada, 1863, p. 128, fig. 57.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 896, figs.

Camarotoechia orientalis Raymond, Ann. Carnegie Mus., 7, 1911, p. 223, pl. 33, figs. 19-22, 24, 33.

Chazy: Mingan Islands (Mingan), St. Martin Junction, near Montreal and Aylmer, Canada (Aylmer).

Camarotoechia pisa (Hall and Whitfield).

Rhynchonella pisa Hall and Whitfield, Pal. Ohio, 2, 1875, p. 135, pl. 7, figs. 18-22.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 78, pl. 32, figs. 24-27.—Whiteaves, Pal. Foss. Geol. Surv. Canada, 3, pt. 2, p. 63.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 897, figs.

Camarotoechia pisa? Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 12, pl. 2, figs. 1A, B.

Niagaran: Highland County, Ohio; Louisville, Kentucky; Ontario (Guelph); etc.

Plesiotype: Cat. No. 51325, U.S.N.M. (Nettelroth).

Camarotoechia plena (Hall).

Atrypa plena Hall, Pal. New York, 1, 1847, p. 21, pl. 4 bis, fig. 7.—Billings, Canadian Nat. Geol., 1, 1856, p. 208, figs. 17-19.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 817, fig. 592.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 191, pl. 3, fig. 28.

Rhynchonella plena Hitchcock, Geol. Vermont, 1, 1862, p. 278.—Chapman, Canadian Jour., n. s., 7, 1862, p. 114, fig. 103; 8, 1863, p. 195, fig. 164; Expos. Min. Geol. Canada, 1864, p. 117, fig. 103; p. 167, fig. 164.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 897, figs.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, pp. 65-66.—Billings, Canadian Nat. Geol., 4, 1859, p. 444, fig. 22; Geol. Canada, 1863, p. 126, fig. 50.

Camarotoechia plena Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 190.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 284, fig. 345.—Raymond, Ann. Carnegie Mus., 7, 1911, p. 221, pl. 33, figs. 7-18.

Atrypa plicifera Hall, Pal. New York, 1, 1847, p. 22, pl. 4 bis, fig. 8.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 191, pl. 3, fig. 29.

Rhynchonella plicifera Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 898, fig.

Atrypa altilis Hall, Pal. New York, 1, 1847, p. 23, pl. 4 bis, fig. 9.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 192, pl. 3, fig. 30.

Rhynchonella altilis Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 883.—Hitchcock, Geol. Vermont, 1, 1861, p. 277, fig. 176.

Chazy: Chazy, etc., New York; South Hero, Vermont (Valcour); Ottawa Valley, Canada (Aylmer).

Camarotoechia pristina Raymond.

Camarotoechia pristina Raymond, Amer. Jour. Sci., 20, 1905, p. 368; Ann. Carnegie Mus., 7, 1911, p. 225, pl. 24, figs. 1-10.

Chazy (Crown Point, Valcour): Valcour Island and Chazy, New York.

Camarotoechia pyrrha (Billings).

Rhynchonella pyrrha Billings, Cat. Sil. Foss. Anticosti, 1866, p. 44.

Anticostian (Gun River): East of Otter River, Anticosti.

Camarotoechia semiplicata (Conrad).

Atrypa semiplicata Conrad, 5th Ann. Rep. Geol. Surv. New York, 1841, p. 56.

Rhynchonella semiplicata Hall, 10th Rep. New York State Cab. Nat. Hist., 1857, p. 65, figs. 1, 2; Pal. New York, 3, 1859, p. 224, pl. 29, figs. 1a-o.

Camarotoechia semiplicata Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 129, pl. 16, figs. 13, 14; pl. 20, fig. 12.

Helderbergian (Coeymans): Schoharie and Carlisle, New York.

Upper Monroan (Lucas): Salt shaft, Detroit, Michigan.

Camarotoechia semiplicata angulata Grabau.

Camarotoechia semiplicata var. *angulata* Grabau, Bull. New York State Mus., 92, 1906, p. 118, fig. 27.

Helderbergian (Keyser—"Transition beds between Rondout and Manlius"): Schoharie Valley, New York.

Camarotoechia vicina (Billings).

Rhynchonella vicina Billings, Cat. Sil. Foss. Anticosti, 1866, p. 44.

Anticostian (Chicotte): Southwest Point, Anticosti.

Camarotoechia (Stegerhynchus) whitii (Hall).

Rhynchonella whitii Hall (not A. Winchell), Trans. Albany Inst., 4, 1863, p. 216; 28th Rep. New York State Mus. Nat. Hist., 1879, p. 164, pl. 26, figs. 23-33; 11th Rep. State Geol. Indiana, 1882, p. 307, pl. 26, figs. 23-33.—Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 39, pl. 4, figs. 1, 2, 4, 5.

Rhynchonella whitiana Miller, Amer. Pal. Fossils, 2d ed., 1883, p. 297.

Camarotoechia? *whitii* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 190.

Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 285, fig. 348.

Niagaran (Waldron): Waldron, etc., Indiana; Newsom, Tennessee,

Camarotoechia (Stegerhynchus) whitii præcursor (Foerste).

Rhynchonella (Stegerhynchus) whitii-præcursor Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 96, pl. 3, figs. 47A-C.

Upper Medinan (Brassfield): Clifton, Tennessee.

Camarotoechia winiskensis Whiteaves.

Camarotoechia(?) *winiskensis* Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 272, pl. 25, figs. 5, 6.

Niagaran: Winisk River, Canada.

CAMEROCERAS Conrad.

Genotype: *C. trentonensis* Conrad.

Cameroceras Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 267.—Hall, Pal. New York, 1, 1847, p. 221, p. 198.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 4.—Saemann, Palaeontographica, 3, 1852, p. 162.—Pictet, Traité Pal., 2d ed., 2, 1854, p. 642.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 148.—Salter, Quart. Jour. Geol. Soc. London, 15, 1859, p. 376, fig. 2.—Barrande, Syst. Sil. Centre Boheme, 2, pt. 3, 1874, p. 782.—Whitfield, Geol. Wisconsin, 4, 1882, p. 228.—Miller, N. A. Geol. Pal., 1889, p. 432.—Clarke, Geol. Minn., 3, pt. 2, 1897, p. 775.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 404.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 39.

Sannionites Waldheim, Oryctographie Gouv. de Moscou, 1837, p. 125.—Barrande, Syst. Sil. Centre Boheme, 2, pt. 3, 1874, p. 769.—Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1883, p. 266.

Proterocameroceras Ruedemann, Bull. New York State Mus., 80, 1905, pp. 322, 325. (Genotype: *Orthoceras brainerdi* Whitfield.)

Suecoceras Holm, Sveriges Geol. Unders., ser. C, No. 163, 1896, p. 11; Geol. Foren. Stockholm Forhandl., 18, 1896, p. 402.

Cameroceras approximatum (Hall).

Endoceras approximatum Hall, Pal. New York, 1, 1847, p. 219, pl. 54, fig. 2a.—Barrande, Bull. Soc. Geol. France, 2d ser., 1855, p. 166; Neues Jahrb. f. Min., etc., 1855, p. 267.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 131.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 244.

Cameroceras approximatum Whitfield and Hovey, Bull. Amer. Mus. Nat. Hist., 11, pt. 1, 1898, p. 58.

Trenton: Middleville, New York.

Cameroceras brainerdi (Whitfield).

Orthoceras brainerdi Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 319, pl. 27, figs. 14-16.—Seely, Rep. State Geol. Vermont, 7, 1910, pl. 56, fig. 5.

Orthoceras explorator Whitfield (not Billings), Bull. Amer. Mus. Nat. Hist., 3, 1890, p. 38, pl. 2, fig. 3.

Cameroceras (*Proterocameroceras*) *brainerdi* Ruedemann, Bull. New York State Mus., 80, 1905, pp. 296-339, figs. 5-18, pls. 6-9; Bull. 90, 1906, p. 405, pl. 1, figs. 5, 6; pl. 2, fig. 1.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 39, fig. 1234.

Canadian (Beekmantown): Fort Cassin, Vermont; Valcour, New York.

Cameroceras curvatum Ruedemann.

Cameroceras curvatum Ruedemann, Bull. New York State Mus., 90, 1906, p. 411, fig. 2, pl. 2, figs. 6, 7.

Chazy (Valcour): Isle La Motte, Vermont; Valcour and Chazy, New York.

Cameroceras duplicatum (Hall).

Endoceras duplicatum Hall, Pal. New York, 1, 1847, p. 219, pl. 55, fig. 1.

Cameroceras duplicatum Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 580.

Trenton: Middleville, New York.

Cameroceras hennepini Clarke.

Cameroceras hennepini Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 779, pl. 52, figs. 1-3; pl. 53, figs. 1-3.

Endoceras hennepini Miller, N. A. Geol. Pal., 2d App., 1897, p. 773 (gen. ref.).

Trenton (Prosser): Two miles northeast of Spring Valley, Minnesota.

Cameroceras inaequabile (Miller).

Endoceras inaequabile Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 86, pl. 4, figs. 3, 3a.

Suecoceras inaequabile Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 73, pl. 1, figs. 1, 2.

Richmond: Bristol, Illinois; Clarksville, Ohio; and Madison, Indiana (Waynesville).

Cameroceras lativentrum (Hall).

Endoceras lativentrum Hall, 3d Rep. New York State Cab. Nat. Hist., rev. ed., 1850, p. 181, pl. 5, fig. 1a, b (doc. ed., p. 173).

Cameroceras lativentrum Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 580 (gen. ref.).

Trenton: Near Lowville, New York.

Cameroceras marcouli (Barrande).

Endoceras marcouli Barrande, Syst. Sil. Centre Boheme, 2, 1874, p. 748, pl. 431, figs. 11-13.

Suecoceras marcouli Holm, Geol. Fören. Stockholm Förh., 18, 1896, pp. 403, 414.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 425, figs. 9-11.

Canadian (Beekmantown): Phillipsburg, Quebec.

CAMEROCERAS PROTEIFORME Clarke. See *Endoceras proteiforme*.

CAMEROCERAS PROTEIFORME var. **ELONGATUM** Clarke and Ruedemann. See *Endoceras proteiforme elongatum*.

Cameroceras tenuiseptum (Hall).

Orthoceras tenuiseptum Hall, Pal. New York, 1, 1847, p. 35, pl. 7, fig. 6.—Raymond, Amer. Pal. Bull. 5, 1, No. 14, 1902, p. 19.

Cameroceeras tenuiseptum—Continued.

Cameroceeras tenuiseptum Ruedemann, Bull. New York State Mus., 90, 1906, p. 408, pl. 3, figs. 1, 2; pl. 4, fig. 1; pl. 5, figs. 5, 6; pl. 6, fig. 2.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 40, fig. 1235.

Chazyan (Day Point—Valcour): Near Chazy and Valcour Island, New York; Isle La Motte, Vermont.

Cameroceeras trentonense Conrad.

Cameroceeras Trentonensis Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 267, pl. 16, fig. 3.—Owen (Emmons), Amer. Jour. Sci. and Arts, 47, 1844, p. 369, fig. 4.—Hall, Pal. New York, 1, 1847, p. 221, pl. 56, figs. 4a-c.—Verneuil and Marcou, Amer. Jour. Sci. and Arts, 2d ser., 17, 1854, p. 292.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 152.—Barrande, Neues Jahrb. f. Min., etc., 1855, p. 266; Bull. Soc. Geol. France, 2d ser., 12, 1855, p. 165.

Trenton: Middleville, New York.

Cameroceeras velox (Billings).

Orthoceras velox Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 173.

Cameroceeras velox Ruedemann, Bull. New York State Mus., 90, 1906, p. 410.

Chazyan: Mingan Island (Mingan), and Islands of Montreal and Bizard, Canada (Aylmer).

CAMPANULITES Troost. See *Cleioocrinus* Billings.

CAMPOTOLITHUS Lindström. See *Lyellia* Edwards and Haime.

CANADOCYSTIS Jaekel.

Genotype: *Malocystites barrandi* Billings.

Canadocystis Jaekel, Zeits. d. d. geol. Gesell., 52, 1900, p. 675.

Sigmacystis Hudson, Bull. New York State Mus., 149, 1911, p. 254. (Genotype: *Malocystites emmonsi* Hudson.)

Canadocystis barrandi (Billings).

Malocystites Barrandi Billings, Geol. Surv. Canada, dec. 3, 1858, pp. 67, 68, figs. 1, 2; pl. 7, figs. 2a-d.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 471.

Canadocystis Barrandei Jaekel, Zeit. d. d. geol. Ges., 52, 1900, pp. 675, 676, fig. 11. *Sigmacystis barrandi* Hudson, Bull. New York State Mus., 149, 1911, p. 253 (gen. ref.).

Chazyan (Aylmer): Montreal, Quebec.

Canadocystis emmonsi (Hudson).

Malocystites emmonsi Hudson, Bull. New York State Mus., 80, 1905, pp. 270-277, figs. 1-3; pl. 1, figs. 3-7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 471, fig. 1783.

Sigmacystis emmonsi Hudson, Bull. New York State Mus., 149, 1911, p. 253, figs. 35, 36.

Chazyan (Crown Point, Valcour): Valcour Island, etc., New York.

CANCER TRILOBIODES Eaton. See *Triarthrus becki*.

CANINIA Dana. See *Zaphrentis Rafinesque*.

CANISTROCRINUS Miller. See *Glyptocrinus* Hall.

CANNAPORE Hall.

Genotype: *C. junciformis* Hall.

Cannapora Hall, Pal. New York, 2, 1852, p. 43.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 86.—Roemer, Lethæa geog., pt. 1, Leth. Pal., 1883, p. 498.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 62.

CANNAPORA ANNULATA Nicholson and Hinde. See *Cannapora junciformis*.

Cannapora junciformis Hall.

Cannapora junciformis Hall, Pal. New York, 2, 1852, p. 43, pl. 18, figs. 1a-f.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 86, pl. 33, fig. 4.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 63.

Cannapora annulata Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 138.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 58.

Niagaran: Ontario, Wayne County, and Rochester, New York (Clinton); Drummond Island, Lake Huron.

CAPELLINIA Hall and Clarke.

Genotype: *C. mira* Hall and Clarke.

Capellinia Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 248, pl. 70, figs. 6-14; 13th Ann. Rep. New York State Geol., 1395, p. 847.—Miller, N. A. Geol. Pal., 2d. App., 1897, p. 759.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 395.

Capellinia mira Hall and Clarke.

Capellinia mira Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 249, pl. 70, figs. 6-14; 48th Rep. New York State Mus., 2, 1895, p. 368, pl. 13, figs. 5-13; 14th Rep. State Geol. New York, 1897, p. 368, pl. 13, figs. 5-13.

Niagaran (Racine): Milwaukee, Wisconsin.

CAPULUS AURIFORMIS Hall. See *Diaphorostoma auriformis*.

CAPULUS CANADENSIS Whiteaves. See *Archinacella canadensis*.

CARABOCCRINUS Billings.

Genotype: *C. radiatus* Billings.

Carabocrinus Billings, Geol. Surv. Canada, Rep. Prog. for 1853-1856, 1857, p. 275; Geol. Surv. Canada, dec. 4, 1859, p. 30, fig. 12.—Zittel, Handb. Pal., 1, Munich, 1879, p. 353.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 366 (Rev. Pal. pt. 1, p. 143); Ibid., 1886, p. 140; ibid., 1890, p. 380.—Billings, Trans. Ottawa Field Nat. Club, 1, 2, 1881, p. 34.—Miller, N. A. Geol. Pal., 1889, p. 230.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 332, pl. 14, fig. 13; Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 172, fig. 84.—Zittel, Grundzuge Pal., 1, 1910, p. 152.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 504.—Springer, Zittel-Eastman Textb. Pal., 1913, p. 217.

Strophocrinus Sardeson, Amer. Geol., 24, 1889, p. 264. (Genotype: *S. dicyclicus* Sardeson.)

Carabocrinus dicyclicus (Sardeson).

Strophocrinus dicyclicus Sardeson, Amer. Geol., 24, 1889, p. 264, pl. 12.

Podolithus strophocrinus Sardeson, Jour. Geol., 14, 1908, p. 242, figs. 8-10.

Black River (Decorah): St. Paul, Minnesota; Ellsworth, Wisconsin.

Carabocrinus geometricus Hudson.

Carabocrinus geometricus Hudson, Bull. New York State Mus., 80, 1905, p. 282, pl. 1, figs. 1, 2, 7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 504, fig. 1816.

Chazy (Valcour): Valcour Island, Lake Champlain, New York.

Carabocrinus ovalis Miller and Gurley.

Carabocrinus ovalis Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 25, pl. 2, figs. 20, 21.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 740, fig. 1323.

Trenton (Curdsville): Mercer County, Kentucky.

Carabocrinus radiatus Billings.

Carabocrinus radiatus Billings, Geol. Surv. Canada, Rep. Prog. for 1853-1856, 1857, p. 276; Geol. Surv. Canada, dec. 4, Can. Org. Rem., 1859, p. 31, pl. 2, figs. 3a-e.—Miller, N. A. Geol. Pal., 1889, p. 230, fig. 261.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 504, fig. 1817.—Springer, Mem. Geol. Surv. Canada, 15 P, 1911, p. 40 (loc. occ.).

Carabocrinus cf. *radiatus* Ruedemann, Bull. New York State Mus., 162, 1912, pl. 3, fig. 6.

Trenton: Ottawa and Kirkfield, Ontario (Curdsville); Snake Hill, Saratoga County, New York (Snake Hill).

Carabocrinus(?) tuberculatus Billings.

Carabocrinus(?) tuberculatus Billings, Geol. Surv. Canada, dec. 4, 1859, p. 33, pl. 10, fig. 2a-c.—Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 9 (loc. ref.).

Richmond (Charleton): Charleton Point, Anticosti.

Carabocrinus vancortlandti Billings.

Carabocrinus vancortlandti Billings, Geol. Surv. Canada, dec. 4, 1859, p. 32, pl. 2, fig. 4.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, 1900, p. 23, fig. 9.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 40.

Trenton (Curdsville): Township of McNab, and Kirkfield, Ontario.

CARCINOSOMA Miller. See *Eusarcus* Grote and Pitt.

CARCINOSOMA INGENS Clappole. See *Eusarcus newlini*.

CARCINOSOMA NEWLINI Clappole. See *Eusarcus newlini*.

CARDIODONTA Hall. See *Stropheodonta* Hall.

CARDIOMORPHA OBLIQUATA Meek. See *Ceromyopsis obliquata*.

CARDIOMORPHA POSTRIATA Emmons. See *Lyrodesma postriata*.

CARDIOMORPHA VENTRICOSA Emmons. See *Whitella ventricosa*.

CARDIOMORPHA VETUSTA Hall. See *Cuneamya vetusta* Hall.

CARDIUM IOWENSIS Owen. See *Cypriocardites iowensis*.

CARINAROOPSIS Hall.

Genotype: *C. carinata* Hall.

Carinaropsis Hall, Pal. New York, 1, 1847, p. 183; 14th Rep. New York State Cab. Nat. Hist., 1861, p. 93.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 314; N. A. Geol. Pal., 1889, p. 400.—Koken, Bull. d. l'Acad. Imp. Sci. St. Petersburg, 7, 1897, p. 139.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pp. 857-926.—Grabau and Shimer, N. A. Index Fossils, 3, 1909, p. 626.

Phragmostoma Hall, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 94.—Zittel, Handb. Pal., 2, 1882, p. 184.—Koken, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 6, 1889, p. 388.—Miller, N. A. Geol. Pal., 1889, p. 415.—Koken, Die Leitfossilien, Leipzig, 1896, p. 99.—Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 42 footnote; Mem. New York State Mus., 6, 1904, p. 322 (Genotype: *Carinaropsis cymbula* Hall).

Carinaropsis acuta Ulrich and Scofield.

Carinaropsis acuta Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 928, pl. 62, figs. 6-9.

Black River (Decorah): Cannon Falls and near Fountain, Minnesota; Lincoln County, Missouri.

Cotypes.—Cat. Nos. 45736, 45737, U.S.N.M.

Carinaropsis carinata Hall.

Carinaropsis carinata Hall, Pal. New York, 1, 1847, p. 183, pl. 40, figs. 1a-c.—Ruedemann, Bull. New York State Mus., 49, 1901, p. 30.

Cyrtolites subcarinatus D'Orbigny, Prodr. Pal., 1, 1849, p. 9.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 167, pl. 6, figs. 25, 26.—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, p. 183, figs.

Carinaropsis? *subcarinata* Ulrich and Scofield, Geol. Minnesota, 3, 1897, p. 859 (gen. ref.).

Trenton: Middleville and Trenton Falls, New York.

Carinaropsis cunulæ (Hall).

Carinaropsis (*Phragmostoma*) *cunulæ* Hall, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 95.

Phragmostoma cunulæ Miller, N. A. Geol. Pal., 1889, p. 415 (gen. ref.).

Carinaropsis cunulæ Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 927, pl. 62, figs. 10-13.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 626, fig. 845a-c.

Trenton: Nashville, Tennessee (Catheys); Boyle County, Kentucky (Flanagan). *Plesiotypes*.—Cat. No. 45738, U.S.N.M.

Carinaropsis cymbula (Hall).

Carinaropsis (*Phragmostoma*) *cymbula* Hall, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 94.

Carinaropsis cymbula Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 927, pl. 62, figs. 1-4.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 626, fig. 845d-g.

Phragmostoma natator (in error for *cymbula*) Hall, 15th Rep. New York State Cab. Nat. Hist., 1862, pl. 6, figs. 12-14.

Phragmostoma cymbula Miller, N. A. Geol. Pal., 1889, p. 415, fig. 693.

Trenton: Allens Bluff, Tennessee (Catheys); Danville, Kentucky (Flanagan). *Plesiotypes*.—Cat. No. 45739, U.S.N.M.

CARINAROPSIS DELETA Sardeson. See *Archinacella deleta*.

Carinaropsis explanata Ulrich.

Carinaropsis explanata Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 929, pl. 62, fig. 5. Trenton (Upper): Covington, Kentucky.

Holotype.—Cat. No. 45740, U.S.N.M.

Carinaropsis minima Ulrich and Scofield.

Carinaropsis minima Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 929, pl. 62, fig. 19.

Black River (Decorah): Near Cannon Falls, Minnesota.

Holotype.—Cat. No. 45741, U.S.N.M.

CARINAROPSIS ORBICULATUS Hall. See *Archinacella orbiculata*.

CARINAROPSIS PATELLIFORMIS Hall. See *Archinacella patelliformis* and *A. pulaskiensis*.

Carinaropsis phalera (Sardeson).

Carinaropsis (or *Bellerophon*) *phalera* Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 336, pl. 6, figs. 14-16.

Carinaropsis phalera Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 928, pl. 62, figs. 14-18.

Black River (Decorah): St. Paul, Minneapolis, and Chatfield, Minnesota; Lincoln County, Missouri.

Plesiotypes.—Cat. Nos. 45742, 45743, U.S.N.M.

- CARINAROPSIS?** *SUBCARINATA* Ulrich and Scofield. See *Carinaropsis carinata*.
- CARINOPORA** Zittel. See *Semicoecinium* Prout.
- CARTODENS** Foerste. See *Pterinea* Goldfuss.
- CARPOMANON** Rauff. Genotype: *Spongia stellatimsulcatum* Roemer.
Carpomanon Rauff, *Palæontographica*, 40, 1894, p. 314.
- Carpomanon glandulosum** Rauff.
Carpomanon glandulosum Rauff, *Palæontographica*, 40, 1894, p. 326, pl. 13, figs. 11, 12.
 Niagaran (Brownsport): Decatur County, Tennessee.
- Carpomanon stellatimsulcatum** (Roemer).
Spongia stellatim-sulcata Roemer, *Neues Jahrb. f. Min., etc.*, 1848, p. 686, pl. 9, fig. 5.
Astylospongia stellatim-sulcata Roemer, *Sil. Fauna West Tennessee*, 1860, p. 11, pl. 1, figs. 2, 2a, 2b; *Cincinnati Quart. Jour. Sci.*, 1, 1874, p. 190; *Leth. geog.*, 1 Theil, *Leth. Pal., Erste Lief.*, 1880, p. 309.
Carpomanon stellatim-sulcatum Rauff, *Palæontographica*, 40, 1894, p. 325, pl. 12, figs. 4-13.
Caryomanon stellatim-sulcatum Foerste, *Jour. Geol.*, 11, 1903, p. 714.
 Niagaran (Brownsport): Brownsport, Perryville, etc., Tennessee.
Plesiotypes.—Cat. Nos. 46578, 49711, U.S.N.M.
- Carpomanon stellatimsulcatum distorta** Rauff.
Carpomanon stellatim-sulcatum var. *distorta* Rauff, *Palæontographica*, 40, 1894, p. 324, pl. 13, figs. 9, 10.
 Niagaran (Brownsport): Decatur County, Tennessee.
- CARYOCARIS** Salter. Genotype: *C. wrighti* Salter.
Caryocaris Salter, *Quart. Jour. Geol. Soc. London*, 19, 1863, pp. 135, 139, fig. 15.—Jones, *Rep. 53d Meeting Brit. Assoc. Adv. Sci.*, 1884, pp. 217, 221.—Zittel, *Handb. Pal.*, 2, 1885, p. 659.—Jones and Woodward, *Mon. Brit. Pal. Phyllopoda*, *Pal. Soc.*, 1888, p. 3; *ibid.*, 1892, p. 89.—Whitfield, *Geol. Surv. Ohio*, *Pal.*, 7, 1893, p. 455.—Gurley, *Jour. Geol.*, 4, 1896, p. 85.—Ruedemann, *Mem. New York State Mus.*, 7, pt. 1, Addendum, 1904, pp. 735-736.—Clarke, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 751.
- Caryocaris curvilatus** Gurley.
Caryocaris curvilatus Gurley, *Jour., Geol.*, 4, 1896, p. 87, pl. 4, fig. 3; pl. 5, fig. 3.—Ruedemann, *Mem. New York State Mus.*, 11, pt. 2, 1908, p. 486, figs. 469, 470.
Caryocaris cf. *curvilineatus* Ruedemann, *Mem. New York State Mus.*, 7, 1904, p. 738, pl. 17, fig. 17.
 Canadian (Levis, *Didymograptus* zone): Point Levis, Quebec; Summit Nevada.
- Caryocaris oblongus** Gurley.
Caryocaris oblongus Gurley, *Jour. Geol.*, 4, 1896, p. 87, pl. 4, fig. 2.
Caryocaris cf. *oblongus* Ruedemann, *Mem. New York State Mus.*, 7, pt. 1, 1904, p. 738, fig. 104; pl. 17, figs. 14-16.
 Canadian (Levis): Point Levis, Quebec.
- Caryocaris wrighti** Salter.
Caryocaris wrightii Salter, *Quart. Jour. Geol. Soc. London*, 19, 1863, p. 139, fig. 15.—Jones and Woodward, *Mon. Brit. Phyllopoda*, pt. 2, 1892, p. 91, fig. 6.—Gurley, *Jour. Geol.*, 4, 1896, p. 87.—Ruedemann, *Mem. New York State Mus.*, 7, pt. 1, 1904, pp. 736, 737, fig. 103; *Mem.* 11, pt. 2, 1908, pp. 486-488, fig. 482.
 Lower Ordovician: Great Britain (Skiddaw); Nevada, Arkansas, etc. (Canadian).

CARYOCRINITES Say.Genotype: *C. ornatus* Say.

Caryocrinites Say, Jour. Acad. Nat. Sci. Philadelphia, 4, 1825, p. 289; Zool. Jour., London, 2, Oct., 1825, p. 311.—Von Buch, Quart. Jour. Geol. Soc. London, 2, 1846, p. 23.—Say (reprint), Bull. Amer. Pal., 1, 1876, p. 347.—Jaekel, Stamm. Pelm., 1, Thecoidea and Cystoidea, 1879, p. 313.—Zittel, Grundzüge Pal., 1, 1910, p. 186.

Caryocrinus Agassiz, Ann. Nat. Hist., 1, 1838, p. 448.—Austin and Austin, Mon. Recent and Fossil Crin., 1845, p. 53, fig.—D'Orbigny, Prodr. Pal., 1, 1847, p. 47.—Hall, Pal. New York, 2, 1852, pp. 216, 248.—Muller, Ann. Mag. Nat. Hist., 2d ser., 13, 1854, p. 247.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 300.—Billings, Amer. Jour. Sci. and Arts, 2d ser., 48, 1869, p. 72; 49, 1870, p. 53; Ann. Mag. Nat. Hist., 4th ser., 5, 1870, pp. 254, 411; Amer. Jour. Sci., 3d ser., 7, 1874, p. 530.—Zittel, Handb. Pal., 1, 1879, p. 418.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1887, pp. 100–113.—Miller, N. A. Geol. Pal., 1889, p. 231.—Carpenter, Rep. 60th Meeting British Assoc. Adv. Sci., 1891, p. 221.—Haeckel, Amphorideen u. Cystoideen, 1896, p. 143, pl. 4, figs. 2L, 2I.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 67, fig. 36.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 149; Bull. New York State Mus., 45, 1901, p. 149.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 464.—Springer, Zittel-Eastman Textb. Pal. 1, 1913, p. 153.

***Caryocrinites bulbulus* (Miller and Gurley).**

Caryocrinus bulbulus Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 11, pl. 2, figs. 15–18.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 740, fig. 1324.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 465.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 11, pl. 2, fig. 2.

Caryocrinites hexagonus Troost, Amer. Jour. Sci. and Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

Caryocrinus hexagonus Shumard, Trans. Acad. Nat. Sci. St. Louis, 2, 1866, p. 359 (gen. ref.).

Niagaran (Brownsport): Wayne and Decatur Counties, Tennessee.

Plesiotype.—Cat. No. 39906, U.S.N.M. (Troost's type of *C. hexagonus*).

***Caryocrinites ellipticus* (Miller and Gurley).**

Caryocrinus ellipticus Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 10, pl. 2, figs. 13, 14.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 740, fig. 1325.

Clinton (Osgood): Osgood, Indiana.

***Caryocrinites globosus* (Troost).**

Caryocrinites globosus Troost, Amer. Jour. Sci. and Arts, 2d. ser., 8, 1849, p. 419 (nom. nud.); Proc. Amer. Assoc. Adv. Sci., 2, 1850 (nom. nud.).

Caryocrinus globosus Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 351.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 11, pl. 2, fig. 1.

Niagaran (Brownsport): Decatur County, Tennessee.

Holotype.—Cat. No. 39907, U.S.N.M.

CARYOCRINITES GRANULATUS Troost. See *Caryocrinites milliganæ*.

***Caryocrinites hammelli* (Miller and Gurley).**

Caryocrinus hammelli Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 9, 1896, p. 65, pl. 5, figs. 5, 6.

Clinton (Osgood): Madison County, Indiana.

CARYOCRINITES HEXAGONUS Troost. See *Caryocrinites bulbulus*.

Caryocrinites indianensis (Miller).

Caryocrinus indianensis Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1892, p. 629, pl. 5, figs. 9, 10 (adv. sheets 1891, p. 19); N. A. Geol. Pal., 1st App., 1892, p. 676, fig. 1218.

Clinton (Osgood): Jefferson County, Indiana.

CARYOCRINITES INSCULPTUS Troost. See *Caryocrinites milliganæ*.**Caryocrinites kentuckiensis** (Miller and Gurley).

Caryocrinus kentuckiensis Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 6, 1895, p. 59, pl. 5, figs. 22-24.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 740, fig. 1320.

Niagaran (Louisville): Louisville, Kentucky.

CARYOCRINITES LORICATUS Say. See *Caryocrinites ornatus*.**CARYOCRINITES MECONIDEUS** Troost. See *Caryocrinites milliganæ*.**Caryocrinites milliganæ** (Miller and Gurley).

Caryocrinus milliganæ Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 9, 1896, p. 63, pl. 5, figs. 3, 4.

Caryocrinites granulatus Troost, Amer. Jour. Sci. and Arts, 2d ser., 8, 1849, p. 419 (nom. nud.); Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

Caryocrinites meconideus Troost, Amer. Jour. Sci. and Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

Caryocrinites insculptus Troost, Amer. Jour. Sci. and Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

Caryocrinites Roemeri Jaekel, Stammes. Pelm., Thecoidea u. Cystoidea, 1899, p. 314, pl. 17, fig. 3; p. 302, fig. 70.

Caryocrinus ornatus Roemer, Sil. Fauna West Tennessee, 1860, p. 33, pl. 3, figs. 1a-c.

Niagaran (Brownport): Decatur County, Tennessee.

Pleiotypes.—Cat. Nos. 39904, 39905, U.S.N.M. (Troost's types of *C. insculptus* and *C. granulatus*).

Caryocrinites ornatus Say.

Caryocrinites ornatus Say, Jour. Acad. Nat. Sci. Philadelphia, 4, 1825, p. 290; Zool. Jour., London, 2, 1825, p. 311, pl. 11, fig. 1.—Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 51, pl. 25, fig. 2.—Buch, Bull. Soc. Geol. France, 2d ser., 1, 1844, p. 209, pl. 3, figs. 7-9, 11-15.—Say, Bull. Amer. Pal., 1, 1896, p. 348.—Jaekel, Stammes. Pelm., 1, Thecoidea u. Cystoidea, 1899, p. 314, figs. 76, 77, pl. 17, fig. 1.—Von Buch, Abhandl. k. Akad. d. Wiss. for 1844, Berlin, 1846, p. 91, pl. 1, figs. 1-7; pl. 1, figs. 1-2.

Caryocrinus ornatus Owen, Amer. Jour. Sci. and Arts, 48, 1845, p. 314, figs. 1, 2.—Austin and Austin, Mon. Recent and Fossil Crinoidea, 1845, p. 53, pl. 7, figs. 3a-m.—Von Buch, Quart. Jour. Geol. Soc. London, 2, 1846, p. 11; Geol. Mem., p. 20, pl. 4, fig. 1.—Hall, Nat. Hist. New York, Geol., 4, 1843, p. 11, figs. 1, 2, etc.; Pal. New York, 2, 1852, p. 182, pl. A41, fig. 1; p. 216, pl. 49, figs. 1a-z; pl. 49A, figs. 1a-z.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 300, pl. 99, fig. 18.—Emmons, Man. Geol., 1860, p. 110, fig. 100.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 7, figs. 4, 5.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 91.—Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 357.—Billings, Canadian Nat., n. s., 4, 1869, p. 280, fig. 2; p. 285, fig. 4; p. 427, fig. 1; Amer. Jour. Sci. and Arts, 2d ser., 48, 1869, p. 72, fig. 3; p. 76, fig. 4; 49, 1870, p. 52, fig. 1.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, pl. 11 (2), fig. 17; rev. ed., 1870, pl. 11, fig. 17.—

Caryocrinites ornatus—Continued.

Billings, Ann. Mag. Nat. Hist., 4th ser., 5, 1870, p. 254, fig. 3; p. 258, fig. 4; p. 410, fig. 1; Pal. Foss. Geol. Surv. Canada, 2, pt. 1, 1874, pp. 92, fig. 52; 93; 96; 97; fig. 53; 98; 105; fig. 64; 124.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 11, fig. 4a.—Zittel, Handb. Pal., 1, 1879, p. 419, fig. 295.—Whitfield, Geol. Wisconsin, 4, 1882, p. 280, pl. 16, figs. 1, 2.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 191, fig.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1887, p. 113, pl. 4, fig. 6.—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 119, figs.—Miller, N. A. Geol. Pal., 1889, p. 231, fig. 262.—Haeckel, Amphorideen u. Cystoideen, Leipzig, 1896, p. 144, fig. 23, pl. 4, figs. 20, 21.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 150, fig. 46; Bull. New York State Mus., 45, 1901, p. 150, fig. 46.—Rowley, Amer. Geol., 34, 1904, p. 280, pl. 16, figs. 47, 50, 52.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 465, figs. 1771–1773.

Caryocrinites loricatus Say, Jour. Acad. Nat. Sci. Philadelphia, 4, 1825, p. 291; Zool. Jour. London, 2, 1825, p. 312; Bull. Amer. Pal., 1, 1896, p. 349 (reprint). Clinton: Lockport, Rochester, etc., New York; Grimsby, etc., Ontario (Irondequoit and Rochester); Osgood, Indiana (Osgood).

CARYOCRINITES ROEMERI Jaekel. See *Caryocrinites milliganæ*.

CARYOCRINUS of authors. See *Caryocrinites* Say.

CARYOCRINUS HEXAGONUS Shumard. See *Caryocrinites bulbulus*.

CARYOCRINUS ORNATUS Roemer. See *Caryocrinites milliganæ*.

CARYOCYSTITES ALTERNATUM Hall. See *Holocystites alternatus*.

CARYOCYSTITES CYLINDRICUM Hall. See *Holocystites cylindricus*.

CARYOMANON Rauff. Genotype: *Spongia incisolobata* Roemer.
Caryomanon Rauff, Palæontographica, 40, 1894, p. 313.

Caryomanon incisolobatum Roemer.

Spongia incisolobata Roemer, Neues Jahrb. f. Min., etc., 1848, p. 685, pl. 9, fig. 4. *Astylospongia incisolobata* Roemer, Sil. Fauna West. Tennessee, 1860, p. 11, pl. 1, figs. 3, 3a; Cincinnati Quar. Jour. Sci., 1, 1874, p. 191.—Hinde, Mon. British Foss. Sponges, Pal. Soc., 1888, p. 114, pl. 2, figs. 5, 5a.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 14.

Caryomanon incisolobatum Rauff, Palæontographica, 40, 1894, p. 325, pl. 14, figs. 7, 8.—Foerste, Jour. Geol., 11, 1903, p. 714.

Niagaran (Brownsport): Brownsport, Perryville, etc. Tennessee.

Caryomanon patel Foerste.

Caryomanon patel Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 107, pl. 1, fig. 15.

Niagaran (Brownsport): Near Martins Mills, Tennessee.

Caryomanon roemeri Rauff.

Caryomanon Roemeri Rauff, Palæontographica, 40, 1904, p. 323, pl. 14, figs. 4–6. *Astylospongia Roemeri* Hinde, Cat. Foss. Sponges, 1883, p. 92, pl. 23, figs. 1a–b. Niagaran (Brownsport): West Tennessee.

CARYOMANON STELLATIM-SULCATUM Foerste. See *Carpomanon stellatimsulcatum*.

CARYOSPONGIA Rauff. Genotype: *Siphonia juglans* Quenstedt.
Caryospongia Rauff, Palæontographica, 40, 1894, p. 296.

Caryospongia juglans nuxmoschata (Hall).

Astylospongia pæmorsa var. *nuxmoschata* Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed. 1879, p. 104, pl. 3, figs. 12, 13; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 223, pl. 2, figs. 12, 13.

Caryospongia juglans (Quenstedt) var. *nuxmoschata* Rauff, *Palæontographica*, 40, 1894, p. 310, pl. 11, figs. 4-6.

Niagaran (Waldron): Waldron, Indiana; Newsom, Tennessee.

Plesiotype.—Cat. No. 46548, U.S.N.M.

CASTOCRINUS KENTUCKIENSIS Miller and Gurley. See *Cremacrinus articulosus*.

CASTOCRINUS Ringueberg. See *Cremacrinus* Ulrich.

CATASCHISMA Branson.

Genotype: *C. typa* Branson.

Cataschisma Branson, Trans. Acad. Sci. St. Louis, 18, 1909, p. 43.

Cataschisma typa Branson.

Cataschisma typa Branson, Trans. Acad. Sci. St. Louis, 18, 1909, p. 43, pl. 7, fig. 15.

Black River (Auburn-Decorah): Lincoln County, Missouri.

CATAZYGA Hall and Clarke.

Genotype: *Athyris headi* Billings.

Catazyga Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 157, fig. 151; 13th Ann. Rep. New York State Geol. 1895, p. 803.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 333.—Cumings, 32d Ann. Rep., Dep. Geol. Nat. Res. Indiana, 1908, p. 887.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 408.

CATAZYGA ERRATICA Hall and Clarke. See *Zygospira erratica*.

Catazyga headi (Billings).

Athyris headi Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 147, fig. 125 (adv. sheets, 1862); Geol. Canada, 1863, p. 212, fig. 214.

Zygospira headi Hall, 23d Rep. New York State Geol. Nat. Hist., 1872, pl. 13, figs. 23-25 (ext. 1871).—Davidson, Suppl. Brit. Sil. Brach., Pal. Soc., 1882, pp. 125, 126, fig.

Glossia headi Miller, N. A. Geol. Pal., 1889, p. 346.

Catazyga headi Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 158, fig. 151; pl. 54, figs. 24-26, 30.

Richmond: St. Lawrence River, opposite Three Rivers; near St. Nicholas, St. Croix, and Becancour River, Quebec.

CATAZYGA HEADI Cumings. See *Catazyga headi schuchertana*.

Catazyga headi anticostiensis (Billings).

Athyris Headi var. *Anticostiensis* Billings, Pal. Foss. 1, Geol. Surv. Canada, 1865, p. 147, fig. 127a, b (adv. sheets, 1862).

Athyris anticostiensis Billings, Geol. Canada, 1863, p. 212, fig. 215.

Zygospira anticostiensis Davidson, Suppl. Brit. Sil. Brach., Pal. Soc., 1882, p. 127, p. 128, figs. 1, 2.

Catazyga headi var. *anticostiensis* Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 54, figs. 33, 34.

Richmond (English Head and Charleton): English Head, etc., Anticosti.

Catazyga headi borealis (Billings).

Athyris Headi var. *borealis* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 147, fig. 126a, b (adv. sheets, 1862).

Athyris borealis Billings, Geol. Canada, 1863, p. 212, fig. 216.

Catazyga headi borealis Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 54, figs. 31-32.

Richmond: Lake St. John and Anticosti, Canada.

CATAZYGA HEADI BOREALIS Hall and Clarke (part). See *Catazyga headi schuchertana*.

Catazyga headi schuchertana (Ulrich).

Glassia schuchertana Ulrich, Amer. Geol., 1, 1888, p. 186.

Zygospira headi Meek, Pal. Ohio, 1, 1873, p. 127, pl. 11, fig. 1.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 59.—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1283, figs.

Catazyga headi var. *borealis* Hall and Clarke (part), Pal. New York, 8, pt. 2, 1895, pl. 54, fig. 27.

Catazyga headi Cummings, 32 Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 896, pl. 33, figs. 1-1c.

Catazyga headi schuchertana Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 32, pl. 2, fig. 3; pl. 3, figs. 2a-c, 11.

Richmond (Waynesville): Blanchester, etc., Ohio; Indiana; Kentucky.

Catazyga uphami (Winchell and Schuchert).

Zygospira uphami Winchell and Schuchert, Amer. Geol., 9, 1892, p. 291; Geol. Minnesota, 3, 1892, p. 463, pl. 34, figs. 45-48.

Catazyga uphami Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 170.

Trenton (Prosser): Near Spring Valley, Wykoff, and Fountain, Minnesota.

CATAZYGA UPHAMI AUSTRALIS Foerste. See *Protorhynchia ridleyana*.

CATENIPORA Lamarck. See *Halysites* Lamarck.

CATENIPORA ESCHAROIDES Lamarck. See *Halysites catenularia*.

CATENIPORA MEANDRINA Troost. See *Halysites labyrinthica*.

CATENIPORA MICHELINI Castelnau. See *Halysites labyrinthica*.

CAUNOPOREA Phillips.

Genotype: *Coscinopora placenta* Lonsdale.

Caunopora Phillips, Pal. Foss. Cornwall, Devon, and West Somerset, 1841, p. 18.—

McCoy, British Pal. Rocks Foss., 1854, p. 66.—Winchell, Proc. Amer. Assoc.

Adv. Sci., 15, 1867, p. 99.—Carter, Ann. Mag. Nat. Hist., 5th ser., 2, 1878, p.

310; 4, 1879, p. 101.—Nicholson and Murie, Jour. Linn. Soc. Zool., 14, 1878,

pp. 219, 211.—Dawson, Quart. Jour. Geol. Soc. London, 35, 1879, p. 56.—

Zittel, Handb. Pal., 1, 1879, p. 286.—Roemer, Geol. Mag., dec. 2, 7, 1880, p.

343.—Spencer, Bull. Mus. Univ. State Missouri, 1, 1884, p. 46; Trans. Acad.

Sci. St. Louis, 4, 1884, p. 596.—Frech, Paleont. Abhandl., Dames and

Kayser, 3, Heft 3, 1886, p. 115.—Nicholson, Mon. Brit. Stromatoporoidea,

Pal. Soc., 1886, pp. 11, 22, 110.—Miller, N. A. Geol. Pal., 1889, p. 156; Zittel

Eastman Textb. Pal., 2d ed., 1913, p. 123.

Caunopora hudsonica Dawson.

Caunopora hudsonica Dawson, Quart. Jour. Geol. Soc. London, 35, 1879, p. 52, pl. 4, fig. 9; pl. 5, fig. 10.

Niagaran: Albany River, Hudson Bay, Canada.

Caunopora mirabilis Spencer.

Caunopora mirabilis Spencer, Bull. Mus. Univ. State Missouri, 1, No. 1, 1884, p.

47, pl. 6, figs. 10, 10a-b; Trans. Acad. Sci. St. Louis, 4, 1884, p. 597, pl. 6,

figs. 10-10b.—Whiteaves, Canadian Rec. Sci., 7, 1896, p. 145.—Parks, Univ.

Toronto Studies (Geol. Ser.), 5, 1908, p. 65.

Niagaran dolomite: Hamilton, Ontario.

CAUNOPORA WALKERI Spencer. See *Protarea walkeri*.

CENTROCRINUS TENNESSEENSIS Worthen. See *Ormocrinus tennesseensis*.

- CENTRONELLA** Billings. Genotype: *Rhynchonella glanstagea* Hall.
Centronella Billings, Canadian Nat. Geol., 4, 1859, p. 131, figs. 1-5; Canadian Jour., 6, 1861, p. 271.—Hall, 16th Rep. New York State Cab. Nat. Hist., 1863, p. 45, figs. 13-17; Amer. Jour. Sci., 2d ser., 35, 1863, p. 396.—Billings, *ibid.*, 36, 1863, p. 237.—Hall, Trans. Albany Inst., 4, 1863, pp. 134, 148. Winchell, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 122.—Hall, Pal. New York, 4, 1867, p. 399.—Hall and Clarke, *ibid.*, 8, pt. 2, 1893, p. 265; 13th Ann. Rep. New York State Geol., 1895, p. 853.
- CENTRONELLA BILLINGSIANA** Meek and Worthen. See *Whitfieldella? billingsana*.
- Centronella? buplicata** Weller.
Centronella? buplicata Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 261, pl. 24, figs. 1-8.
 Helderbergian (Keyser—"Manlius"): Nearpass quarry, two miles south of Tri-States, New York.
- CERAMOPHYLLA** Ulrich. Genotype: *Ceramophylla frondosa* Ulrich.
Ceramophylla Ulrich, Geol. Minnesota, 3, 1893, p. 331.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 24.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 123.—Bassler, Zittel-Eastman Textb., Pal. 1913, p. 328.
- Ceramophylla frondosa** Ulrich.
Ceramophylla frondosa Ulrich, Geol. Minnesota, 3, 1893, p. 331, pl. 28, figs. 3-7; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 268, fig. 438.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 123, fig. 182b.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 328, fig. 466.
 Black River (Decorah): St. Paul and Goodhue County, Minnesota.
Cotypes.—Cat. No. 43279, U.S.N.M.
- CERAMOPORA** Hall. Genotype: *C. imbricata* Hall.
Ceramopora Hall, Amer. Jour. Sci., 2d ser., 11, 1851, p. 400; Pal. New York, 2, 1852, p. 168.—Pictet, Traite de Pal., 4, 1857, p. 170.—Eichwald, Lethaea Rossica, 1, 1860, p. 412.—Zittel, Handb. Pal., 1880, p. 617.—Vine, Quart. Jour. Geol. Soc. London, 36, 1880, p. 358.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 156.—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 169.—Hall and Simpson, Pal. New York, 6, 1887, p. xviii.—James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 36.—Miller, N. A. Geol. Pal., 1889, p. 296.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 380, 462.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 112.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 267.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 563.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 23.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 162; Bull. New York State Mus., 45, 1901, p. 162.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 18.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 121.—Hennig, Archiv. fur Zool., 4, No. 21, 1908, p. 1.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 76; Zittel-Eastman Textb. Pal., 1913, p. 327.
- CERAMOPORA AGELLUS** Hall. See *Ceramopora? confuens*.
- CERAMOPORA ALTERNATA** James. See *Coeloclema alternatum*.
- CERAMOPORA? BEANI** James. See *Paleschara beani*.
- Ceramopora concentrica** James. Not recognized.
Ceramopora concentrica James, Paleontologist, 1, 1878, p. 5.—James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 38, pl. 1, figs. 8, 8a.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 25.

Ceramopora concentrica—Continued.

Eden: Cincinnati, Ohio, and vicinity.

Observation.—Upon restudy in 1906 the type lot was found to contain a mixture of species. The only specimen ever illustrated (James and James, 1888) proved to be an example of *Hallopora onealli sigillarioides*.

Ceramopora? confluens Hall.

Ceramopora confluens Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 7, figs. 4, 5; mus. ed., 1879, p. 119, pl. 8, figs. 4, 5; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 243, pl. 7, figs. 4, 5.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, pl. 20, figs. 14, 15.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 197.

Ceramopora? (Berenicea) labecula Hall, 23th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 8, figs. 1-3; mus. ed., 1879, p. 119, pl. 8, figs. 1-3.

Ceramopora labecula Hall, 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 242, pl. 7, figs. 1-3.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, pl. 20, fig. 11.

Ceramopora agellus Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 8, fig. 6; mus. ed., 1879, p. 120, pl. 8, fig. 6.—Hall, 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 243, pl. 7, fig. 6.

Niagaran (Waldron): Waldron, Indiana.

Observation.—This species is probably a *fistuliporoid*. *C. agellus* and *C. labecula* are apparently young specimens.

Ceramopora? expansa (James).

Alveolites expansa James, Paleontologist, No. 3, 1879, p. 19.

Ceramopora expansa Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 169; 3, 1888, pl. 17, fig. 13.

Upper Medinan (Brassfield): Clinton County, Ohio.

Ceramopora? explanata Hall.

Ceramopora? (Lichenalia?) explanata Hall, Trans. Albany Inst., 10, 1883, p. 61 (abs., 1879, p. 5); 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 245.

Niagaran (Waldron): Waldron, Indiana.

Observation.—Can not be recognized without restudy of types.

CERAMOPORA FOLIACEA Hall. See *Meekopora foliacea*.**Ceramopora imbricata** Hall.

Ceramopora imbricata Hall, Pal. New York, 2, 1852, p. 169, pl. 40e, figs. 1a-i.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 463, pl. 39, figs. 1-b.—Grabau, Bull. New York State Mus., 45, 1901, p. 163, fig. 58; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 163, fig. 58.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 19, pl. 6, figs. 1-10.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 121, fig. 181.

Clinton: Rochester, Lewiston, and Lockport, New York; Grimsby, Hamilton, and Thorold, Ontario (Rochester); Osgood, Indiana (Osgood).

Pleiotypes.—Cat. Nos. 35464, 43280, U.S.N.M.

Ceramopora incondita Ulrich and Bassler.

Ceramopora? incondita Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 260, pl. 41, figs. 13-17; pl. 44, figs. 1-3.

Helderbergian (Keyser): Near Cumberland and Pinto, Maryland; Keyser, West Virginia.

Cotypes.—Cat. No. 53667, U.S.N.M.

CERAMOPORA INCRUSTANS Hall. See *Fistulipora crustula*.

CERAMOPORA? IRREGULARIS James. See *Batostoma implicatum* and *B. jamesi*.

CERAMOPORA? (BERENICEA) LABECULA Hall. See *Ceramopora? confluens*.

Ceramopora niagarensis Bassler.

Ceramopora niagarensis Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 19, 20, pl. 6, figs. 11-13.

Clinton: Rochester and Lockport, New York; Grimsby, Ontario (Rochester); Osgood, Indiana (Osgood).

Cotypes.—Cat. No. 35736, U.S.N.M.

Ceramopora nicholsoni James.

Not recognized.

Ceramopora Nicholsoni James, Cat. Foss. Cincinnati Group, 1875, p. 3.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 27.

Monticulipora (Fistulipora) nicholsoni James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 34, pl. 1, figs. 6, 6c.—J. F. James, *ibid.*, 18, 1896, p. 121, fig. 12.

Maysville: Cincinnati, Ohio, and vicinity.

Observation.—A study of the types in 1906 showed they did not have the characters assigned them by the author of the species.

Ceramopora? notha Hall.

Ceramopora (Paleschara?) nothus Hall, Trans. Albany Inst., 10, 1883, p. 62 (abs., 1879, p. 6); 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 244.

Niagaran (Waldron): Waldron, Indiana.

Observation.—Can not be recognized without a restudy of types.

CERAMOPORA OHIOENSIS Nicholson. See *Ceramoporella ohioensis*.

CERAMOPORA ORBICULATA Ringueberg. See *Ceramoporella orbiculata*.

CERAMOPORA RADIATA James. See *Ceramoporella granulosa milfordensis*.

Ceramopora? raripora Hall.

Ceramopora raripora Hall, 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 244; Trans. Albany Inst., 10, 1883, p. 62 (abs., 1879, p. 6).

Niagaran (Waldron): Waldron, Indiana.

Observation.—Species can not be recognized from description.

CERAMOPORA WHITEI (James). See *Ceramoporella whitei*.

CERAMOPORELLA Ulrich.

Genotype: *C. distincta* Ulrich.

Ceramoporella Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 156.—Miller, N. A. Geol. Pal., 1889, p. 297.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 380, 464; Geol. Minnesota, 3, 1893, p. 328.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 15.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 267.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 564.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 23.—Bassler, *ibid.*, 292, 1906, p. 20.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 121.—Cumings, 32d Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 742.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 81; Zittel-Eastman Textb. Pal., 1913, p. 327.

Ceramoporella distincta Ulrich.

Ceramoporella distincta Ulrich, Geol. Surv. Illinois, 8, 1890, p. 464, pl. 39, figs. 6, 6a.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 200.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 122.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 799, pl. 10, fig. 7; pl. 11, figs. 2, 2a.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 327, fig. 462.

Ceramoporella distincta—Continued.

Not *Ceramoporella distincta* Ulrich, Geol. Minnesota, 3, 1893, p. 328, pl. 28, fig. 13; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 267, fig. 435.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 565, fig. 130.

Eden and Maysville (Fairview): Cincinnati, Ohio, and vicinity.

Cotypes.—Cat. No. 43225, U.S.N.M.

Ceramoporella granulosa Ulrich.

Ceramoporella granulosa Ulrich, Geol. Surv. Illinois, 8, 1890, p. 466, pl. 41, figs. 2, 2a.—Nickles and Bassler, Bull. U. S. Geol. Surv., p. 173, 1900, p. 200.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 799, pl. 11, figs. 3, 3a.

Richmond: Wilmington, Illinois; Iron Ridge, Wisconsin; Richmond and Versailles, Indiana; Oxford, Waynesville, and other localities in Ohio.

Sections of *holotype*.—Cat. No. 43227, U.S.N.M.

Ceramoporella granulosa milfordensis (James).

Callopora milfordensis James, Paleontologist, No. 2, 1878, p. 11.

Monticulipora (*Fistulipora*) *milfordensis* James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 36, pl. 1, figs. 7-7b.—J. F. James, *ibid.*, 18, 1896, p. 122.

Ceramoporella granulosa-milfordensis Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 200.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 28, pl. 6, fig. 7.

Ceramopora radiata James, Paleontologist, No. 2, 1878, p. 12.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 199.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 28.

Fistulipora sp.? Hall and Simpson, Pal. New York, 6, 1889, pl. 14, figs. 15-17; pl. 23, fig. 4.

Eden: Milford, Ohio; Cincinnati, Ohio, and vicinity.

Ceramoporella granulosa minor Bassler.

Ceramoporella granulosa minor Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 81, 82, fig. 22.

Black River (Decorah): Minnesota.

Ordovician (Jewe and Wassalem): Uxnorn, Esthonia, Russia.

Ceramoporella inclusa Ulrich.

Ceramoporella inclusa Ulrich, Geol. Minnesota, 3, 1893, p. 329, pl. 28, figs. 8-11.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 565, fig. 132.—

Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 122, fig. 178j.

Black River (Decorah): Cannon Falls, St. Paul, etc., Minnesota.

Cotypes.—Cat. Nos. 43223, 54701, U.S.N.M.

Ceramoporella interporosa Ulrich.

Ceramoporella interporosa Ulrich, Geol. Minnesota, 3, 1893, p. 330, pl. 28, fig. 12.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 565, fig. 131.

Trenton (Prosser): Goodhue County, Minnesota.

Holotype.—Cat. No. 43226, U.S.N.M.

CERAMOPORELLA IRREGULARIS Bassler. See *Ceramoporella reticulata*.

Ceramoporella? Irregularis (Whitfield).

Alveolites irregularis Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1877, 1878, p. 72; Geol. Surv. Wisconsin, 4, 1882, p. 251, pl. 11, figs. 1, 2.

Ceramoporella? irregularis Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 200.

Richmond (Maquoketa): Iron Ridge, Wisconsin.

Ceramoporella ohioensis (Nicholson).

Ceramopora Ohioensis Nicholson, Pal. Ohio, 2, 1875, p. 265, pl. 25, figs. 10a, b, c (not 10c, d).—James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1878, p. 37.—Miller, N. A. Geol. Pal., 1889, p. 297, fig. 466.

Ceramoporella? ohioensis Ulrich, Geol. Surv. Illinois, 8, 1890, p. 466, pl. 39, figs. 2, 2a.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1907, p. 800, pl. 11, figs. 4–4g.—Grabau and Shimer, N. A. Index Fossils, 1, 1908, p. 122.

Eden—Richmond: Cincinnati, Ohio, and vicinity; Indiana; Kentucky; Tennessee; Illinois; Wisconsin.

Plesiotype.—Cat. No. 43224, U.S.N.M.

Ceramoporella orbiculata (Ringueberg).

Ceramopora orbiculata Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, 1886, p. 19, pl. 2, figs. 13, 13a.

Ceramoporella orbiculata Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 20, pl. 9, figs. 12–15.

Clinton (Rochester): Lockport, Rochester, etc., New York; Grimsby, Ontario.

Plesiotypes.—Cat. No. 35478, U.S.N.M.

Ceramoporella reticulata (Spencer).

Dictyostoma reticulatum Spencer, Bull. Missouri State Mus., 1, 1884, p. 51, pl. 6, figs. 14, 14a; Trans. Acad. Sci. St. Louis, 4, 1884, p. 601, pl. 6, figs. 14, 14a.

Dictyostoma reticulatum Whiteaves, Canadian Rec. Sci., 7, 1896, p. 145.

Ceramoporella irregularis Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 21, pl. 9, figs. 7–9.—Parks, Univ. Toronto Studies, geol. ser., No. 5, 1908, p. 63, pl. 9, fig. 9; pl. 14, fig. 1.

Clinton (Rochester): Hamilton, Ontario; Rochester, New York.

Plesiotype.—Cat. No. 35480, U.S.N.M. (Bassler's type of *C. irregularis*).

Ceramoporella stellata Ulrich.

Ceramoporella stellata Ulrich, Geol. Surv. Illinois, 8, 1890, p. 465, pl. 41, figs. 1, 1a. Richmond (Maquoketa): Sterling, Illinois.

Ceramoporella triloba Cumings and Galloway.

Ceramoporella triloba Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 74, pl. 6, figs. 1–1c.

Eden (McMicken): Big Four Railroad, near Guilford, Indiana.

Ceramoporella tubulosa Cumings and Galloway.

Ceramoporella tubulosa Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 75, pl. 6, figs. 2, 2a; pl. 7, figs. 1–1c.

Eden (McMicken): Big Four Railroad, near Guilford, Indiana.

Ceramoporella whitei (James).

Ceramopora Whitei James, Paleontologist, No. 2, 1878, p. 12.—James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 38, pl. 1, figs. 9, 9a.

Ceramoporella whitei Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 201 (gen. ref.).—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 29, pl. 5, fig. 6; pl. 6, figs. 8–10.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 801.

Maysville: Cincinnati, Ohio, and vicinity.

CERATELLA Ulrich. See *Ceratopsis* Ulrich.**CERATIOCARIS** McCoy.

Genotype: *C. solenoides* McCoy.

Ceratiocaris McCoy, Ann. Mag. Nat. Hist., 2d ser., 1849, p. 412; Cont. British Pal., 1854, p. 151, fig.—Miller, N. A. Geol. Pal., 1889, p. 537.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 375.—Clarke, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 750.

***Ceratiocaris aculeata* (Hall).**

Ceratiocaris aculeatus Hall, Pal. New York, 3, 1859, p. 422, pl. 80A, fig. 10.—Jones, Rep. 55th Meeting British Assoc. Adv. Sci., 1886, p. 355.—Jones and Woodward, Mon. British Pal. Phyllopoda, Pal. Soc., 1888, p. 62.

Cayugan (Bertie): Waterville, New York.

***Ceratiocaris acuminata* Hall.**

Ceratiocaris acuminatus Hall, Pal. New York, 3, 1859, p. 422, pl. 84, fig. 6.—Pohman, Bull. Buffalo Soc. Nat. Sci., 5, 1886, p. 28, pl. 3, fig. 2.—Jones, Rep. 55th Meeting British Assoc. Adv. Sci., 1886, p. 354.—Jones and Woodward, Mon. British Pal. Phyllopoda, Pal. Soc., 1888, p. 27.—Stose, Proc. Boston Soc. Nat. Hist., 26, 1894, p. 369, figs.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 227, fig. 159; Bull. New York State Mus., 45, 1901, p. 227, fig. 159.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 375, fig. 1676.

Cayugan (Bertie): Buffalo, New York.

***Ceratiocaris deweyi* (Hall).**

Onchus deweyi Hall, Pal. New York, 2, 1852, p. 320, pl. 71, figs. 3a-d.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 824, fig. 639.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 495, figs.

Ceratiocaris? *deweyi* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 83.—Jones, Rep. 55th Meeting British Assoc. Adv. Sci., 1886, p. 354.

Ceratiocaris (*Phasganocaris?*) *deweyi* Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 227, fig. 160; Bull. New York State Mus., 45, 1901, p. 227, fig. 160.

Clinton (Rochester): Lockport and Rochester, New York.

CERATIOCARIS GRANDIS Pohlman. See *Pterygotus* (*Erettopterus*) *grandis*.

***Ceratiocaris maccoyana* Hall.**

Ceratiocaris maccoyanus Hall, Pal. New York, 3, 1859, p. 421, pl. 84, figs. 1-5.—Jones, Rep. 55th Meeting British Assoc. Adv. Sci., 1886, p. 354.

Cayugan (Bertie): Buffalo, New York.

***Ceratiocaris* (*Limnocaris*) *præcedens* Clarke.**

Ceratiocaris (*Limnocaris*) *præcedens* Clarke, 54th Rep. New York State Mus., 1901, p. 92, pl. 3, figs. 5-10.

Cayugan (Pittsford): Near Pittsford, Monroe County, New York.

CERATOCEPHALA Warder.

Genotype: *C. goniata* Warder.

Ceratocephala Warder, Amer. Jour. Sci., 34, 1838, pp. 377, 378.—Vogdes, Proc. Acad. Nat. Sci. Philadelphia, 1877, p. 139.—Clarke, 10th Rep. State Geol. New York for 1890, 1891, pp. 63, 66-68; 44th Rep. New York State Mus., 1892, p. 93, 96-98.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 722.

Acanthaloma Conrad, 3d Ann. Rep. New York. Geol. Surv., 1840, p. 206.—Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 23.—Hall, Pal. New York, 3, 1861, p. 370.—Clarke, 10th Rep. State Geol. New York for 1890, 1891, p. 64; 44th Rep. New York State Mus., 1892, p. 94.

***Ceratocephala anchoralis* (Miller).**

Acidaspis anchoralis Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 349, figs. 23, 24; N. A. Geol. Pal., 1889, p. 526, figs. 951, 952.

Maysville: Cincinnati, Ohio, and vicinity.

***Ceratocephala ceralepta* Anthony.**

Ceratocephala ceralepta Anthony, Amer. Jour. Sci., 34, 1838, p. 379, figs.—Vogdes, Proc. Acad. Nat. Sci. Philadelphia, 1877, p. 140.—Clarke, 44th Rep. New York State Mus., 1892, pp. 98, 101.

***Ceratocephala cerealepta*—Continued.**

Acidaspis cerealepta Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 169, pl. 14, figs. 8, 9.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 130.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1052, pl. 54, figs. 1, 1a. Maysville: Cincinnati, Ohio, and vicinity.

***Ceratocephala cincinnatiensis* (Meek).**

Acidaspis Cincinnatiensis Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 167, pl. 14, fig. 3.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 130.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1023, pl. 54, figs. 2, 4. *Ceratocephala cincinnatiensis* Vogdes, Proc. Acad. Nat. Sci. Philadelphia, 1877, p. 140. *Acidaspis rhynchocephalus* Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 169.—Miller, Cincinnati Quart. Jour. Sci., 1874, p. 131. Eden: Cincinnati, Ohio and vicinity.

***Ceratocephala coalescens* Van Ingen.**

Ceratocephala coalescens Van Ingen, School of Mines Quart., 23, 1901, p. 48, fig. 11, p. 41. Niagaran (St. Clair): St. Clair Spring, Independence County, Arkansas.

***CERATOCEPHALA CROSOTUS* Vogdes.** See *Odontopleura crosota*.

***Ceratocephala depauperata* Van Ingen.**

Ceratocephala goniata depauperata Van Ingen, School of Mines Quart., 23, 1901, p. 42. Niagaran (St. Clair): St. Clair Spring, Independence County, Arkansas.

***Ceratocephala fimbriata* (Hall).**

Acidaspis fimbriata Hall, 11th Rep. Dep. Geol. Nat. Hist., Indiana, 1882, p. 334, pl. 33, fig. 11; Trans. Albany Inst., 10, 1883, p. 76. *Ceratocephala fimbriata* Clarke, 44th Rep. New York State Mus., 1892, p. 101 (gen. ref.) Niagaran (Waldron): Waldron, Indiana; Newson, Tennessee.

***Ceratocephala goniata* Warder.**

Ceratocephala goniata Warder, Amer. Jour. Sci., 1st ser., 34, 1838, p. 378, fig.—Vogdes, Proc. Acad. Nat. Sci. Philadelphia, 1877, p. 140.—Clarke, 44th Rep. New York State Mus. Nat. Hist., 1892, pp. 91–100, pl. 1, fig. 1.—Kindle, 28th Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 480, pl. 24, fig. 13.—Van Ingen, School of Mines Quart., 23, 1901, p. 42, pl., figs. 3, 3a.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 255, pl. 23, figs. 1–2.—Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 38. *Acidaspis ida* Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, pp. 106, 109, 112, pl. 3, fig. 13.—Vogdes, Proc. Acad. Nat. Sci. Philadelphia, 1877, p. 140. *Acidaspis danai* Hall, Geol. Surv. Wisconsin, 1, 1862, p. 432 (no description); Adv. sheets, 18th Rep. New York State Cab. Nat. Hist., 1865, p. 28; 20th Rep., 1867, p. 333, pl. 21, figs. 8, 9, p. 389; rev. ed., 1870, p. 423, pl. 21, figs. 8, 9. Niagaran: Near Springfield, Ohio; Bridgeport, etc., Illinois; Port Daniel, Bay of Chaleurs and Lake Memphremagog, Quebec.

***CERATOCEPHALA GONIATA DEPAUPERATA* Van Ingen.** See *Ceratocephala depauperata*.

***CERATOCEPHALA HALLI* Vogdes.** See *Odontopleura halli*.

***Ceratocephala horani* (Billings).**

Acidaspis horani Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 341; Geol. Canada, Geol. Surv. Canada, 1863, p. 190, fig. 190.

Ceratocephala Horani Vogdes, Proc. Acad. Nat. Sci. Philadelphia, 1877, p. 140.—Clarke, 10th Rep. State Geol. New York, 1891, pp. 69, 71; 44th Rep. New York State Mus., 1892, pp. 99, 101.

Trenton: Riviere a la Friponne near Cape Tourment, Canada.

***Ceratocephala narrawayi* Raymond.**

Ceratocephala narrawayi Raymond, 7th Rep. State Geol. Vermont, 1910, p. 234, pl. 38, fig. 5; pl. 39, fig. 15; Ann. Carnegie Mus., 7, 1910, p. 73, pl. 18, fig. 5; pl. 19, fig. 15.—Perkins, 8th Rep. Vermont State Geol., 1912, pl. 18, fig. 5.

Chazy (Crown Point): Chazy, New York.

***Ceratocephala nodulata* Van Ingen.**

Ceratocephala nodulata Van Ingen, School of Mines Quart., 23, 1901, p. 44, fig. 10; p. 41, figs. 4, 5.

Niagaran (St. Clair): St. Clair Spring, Independence County, Arkansas.

CERATOCEPHALA TRENTONENSIS? Vogdes. See *Odontopleura trentonensis*.

***CERATOPEA* Ulrich.**

Genotype: *C. keithi* Ulrich.

Ceratopea Ulrich, Bull. Geol. Soc. Amer., 22, 1911, p. 665.

***Ceratopea keithi* Ulrich.**

Operculum of ?*Maclurea*, Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, pl. 20, fig. 3.

Ceratopea keithi Ulrich, Bull. Geol. Soc. Amer., 22, 1911, p. 665.

Canadian (Beekmantown): Wytheville, Virginia; Tennessee; Missouri.

***CERATOPORA* Grabau.**

Genotype: *C. jacksoni* Grabau.

Ceratopora Grabau, Proc. Boston Soc. Nat. Hist., 28, 1899, p. 414; Bull. Buffalo Soc. Nat. Hist., 6, 1899, p. 132.

***Ceratopora? marylandica* Swartz.**

Ceratopora? marylandica Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 220, pl. 26, figs. 6, 7.

Helderbergian (Keyser): Keyser, West Virginia; Maryland.

***Ceratopora regularis* Grabau.**

Ceratopora regularis Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 109, pl. 11, fig. 8.

Upper Monroan (Amherstburg): Detroit River opposite Amherstburg, Ontario.

***Ceratopora tenella* (Rominger).**

Syringopora tenella Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 81, pl. 30, fig. 4.

Ceratopora tenella Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 110, pl. 14, fig. 6.

Niagaran: Point Detour, Drummonds Island, Lake Huron.

Upper Monroan (Anderdon): Near Amherstburg, Ontario.

***CERATOPSIS* Ulrich.**

Genotype: *Beyrichia chambersi* Miller.

Ceratella Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 113 (nom. nud.).

Ceratopsis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 675; Zittel-Eastman Textb.

Pal., 1, 1900, p. 644.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 308.—Bonnema, Mitt. Min. Geol. Inst. Groningen, 2, 1909, p. 39.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1040.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 352.—Bassler, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 738.

***Ceratopsis chambersi* (Miller).**

Beyrichia chambersi Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 234, fig. 27;
N. A. Geol. Pal., 1889, p. 534, fig. 975.

Tetradella chambersi Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 112.

Ceratopsis chambersi Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 676, pl. 46, figs. 19-22.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 39, figs. 13-16.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1042, pl. 53, figs. 1, 1a.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 352, fig. 1660a-c.—Ruedemann (var.), Bull. New York State Mus., 162, 1912, p. 121, pl. 9, fig. 15.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 738, fig. 1425k.

Black River and Trenton: Minneapolis, etc., Minnesota.

Eden: Cincinnati, Ohio, and vicinity; Albany County, New York (Indian Ladder).

Plesiotypes.—Cat. No. 41506, U.S.N.M.

CERATOPSIS CHAMBERSI ROBUSTA Cumings. See *Ceratopsis robusta*.

***Ceratopsis intermedia* Ulrich.**

Ceratopsis intermedia Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 676.

Trenton: Covington, etc., Kentucky.

Cotypes.—Cat. No. 41500, U.S.N.M.

***Ceratopsis oculifera* (Hall).**

Beyrichia oculifera Hall, 24th Rep. New York State Mus. Nat. Hist., 1872, p. 232, pl. 8, figs. 9, 10 (extract, 1871, p. 8, pl. 4, fig. 10).—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 118.—Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 103, pl. 4, figs. 9, 10.—Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 21, pl. 4, figs. 19a, b, 20.

Tetradella oculifera Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 113, fig. 1.

Ceratopsis oculifera Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 676.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 39, figs. 19, 20.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1044, pl. 53, figs. 3, 3a.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 352, fig. 1662.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

***Ceratopsis? quadrifida* (Jones).**

Beyrichia quadrifida Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, p. 66, pl. 11, figs. 9a, b.

Ceratopsis? quadrifida Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 308, pl. 39, figs. 21, 22.

Trenton: Lorette Falls, Quebec.

***Ceratopsis robusta* (Ulrich).**

Beyrichia chambersi Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 104, pl. 4, figs. 11, 12.

Beyrichia chambersi var. *robusta* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 677, fig. 50.

Ceratopsis chambersi var. *robusta* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1043, pl. 53, figs. 2, 2a.

Ceratopsis robusta Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 308, pl. 39, figs. 17, 18.

Richmond: Waynesville, etc., Ohio; Richmond and Versailles, Indiana; near Spring Valley, Minnesota.

Holotype.—Cat. No. 41335, U.S.N.M.

CERATOPYGE Hawle and Corda.Genotype: *Olenus forficula* Sars.

Ceratopyge Hawle and Corda, Abh. böhmischen Gesell. d. Wiss., 5, 1847 (extract), p. 161, pl. 7, fig. 81.—Koken, Die Leitfossilien, Leipzig, 1896, p. 19, text fig. 12.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, p. 25.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 717.

Ceratopyge canadensis Walcott.

Ceratopyge canadensis Walcott, Smiths. Misc. Coll., 57, 1912, p. 233, pl. 35, figs. 13-22.

Lower Ordovician (Goodsir): Mollison Creek, and Ice River Valley, ten miles southeast of Leacholl, British Columbia.

CERAURINUS Barton.Genotype: *C. marginatus* Barton.

Cheirurus and *Ceraurus* (part) of authors.

Ceraurinus Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 547.

Ceraurinus confluens Barton.

Ceraurinus confluens Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 555, pl., fig. 3.

Trenton (Picton): Pefferlaw and Collingwood, Ontario.

Ceraurinus icarus (Billings).

Cheirurus Icarus Billings, Canadian Nat. Geol., 5, 1860, p. 67, fig. 2; Geol. Canada, Geol. Surv. Canada, 1863, p. 219, fig. 231; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 27 (loc. ref.).—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 128 (loc. occ.).

Ceraurus (*Eccoptochile*) *icarus* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 738 (gen. ref.).

Ceraurus icarus Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 162, pl. 14, figs. 11a-c.—Miller, Cincinnati Quart. Jour. Sci. 1, 1874, p. 133.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1059, pl. 54, figs. 8, 8a.

Ceraurus meekanus Miller, N. A. Geol. Pal., 1889, p. 537.

Eccoptochile? *meekanus* Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 75, pl. 17, figs. 6-9.

Ceraurinus icarus Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 551, pl., fig. 7.

Richmond: Charleton Point, English Head, etc., Anticosti (English Head, Charleton, and Gamachian); Stony Mountain, Manitoba (Stony Mountain); Ohio; Indiana; Iowa.

Ceraurinus marginatus Barton.

Ceraurinus marginatus Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 550, pl., fig. 1.

Richmond: Manitoulin Island, Lake Huron.

Ceraurinus polydorus (Billings).

Cheirurus Polydorus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 286, fig. 274.

Ceraurus polydorus Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 738 (gen. ref.).

Ceraurinus polydorus Barton, Bull. Mus. Comp. Zool., 54, 1913, 549.

Chazy (Quebec-N): Table Head and Portland Creek, Newfoundland.

Ceraurinus pompilius (Billings).

Cheirurus Pompilius Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 181, fig. 162.

Ceraurus (*Ceraurus*) *pompilius* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 738.

Ceraurus (*Crotalocephalus*) *pompilius* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 319.

Ceraurinus pompilius Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 550.

Chazy (Mingan): Large Island, Mingan Islands, Quebec.

Ceraurinus scofieldi (Clarke).

Cyrtometopus scofieldi Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 735, fig. 55.

Ceraurus scofieldi Miller, N. A. Geol. Pal., 2d App. 1897, p. 787 (gen. ref.).

Ceraurinus scofieldi Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 554, pl., fig. 4.

Black River: Minneapolis, Minnesota (Platteville); Newport, New York.

?Stones River (Lebanon); Lebanon, Tennessee.

Holotype.—Cat. No. 41952, U.S.N.M.

Ceraurinus trentonensis Barton.

Ceraurinus trentonensis Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 552, pl., figs. 5, 6.

Trenton (Curdsville): Goat Island, Manitoulin Islands, Lake Huron.

CERAURUS Green.

Genotype: *C. pleurexanthemus* Green.

Ceraurus Green, Mon. Tril. N. A. 1832, p. 83; Monthly Amer. Jour. Geol., 1, 1832, p. 560.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, pp. 540, 551.—Hawle and Corda, Abh. d. böhmischen Gesell. d. Wiss., 5 (ext.), 1847, p. 161, pl. 7, fig. 82.—Hall, Pal. New York, 1, 1847, p. 244.—Roemer, Neues Jahrb., f. Min., etc., 1848, p. 179.—McCoy, Ann. and Mag. Nat. Hist., 2d ser., 4, 1849, p. 400; British Pal. Rocks and Fossils, 1854, p. 153.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 217.—Chapman, Canadian Jour., n. s., 1, 1856, p. 282.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 67.—Hitchcock, Geol. Vermont, 1, 1862, p. 300.—Chapman, Canadian Jour., n. s., 8, 1863, p. 31; Expos. Min. Geol. Canada, 1864, p. 139.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 132.—Walcott, Annals Lyceum Nat. Hist. New York, 11, 1875, p. 155 footnote.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 30, 1881, p. 121.—Miller, N. A. Geol. Pal., 1889, p. 537.—W. D. Matthew, Trans. New York Acad. Sci., 12, 1893, p. 238.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, pp. 736, 738.—Walcott, Geol. Mag., dec. 4, 1, 1894, pp. 247, 248; Proc. Biol. Soc. Washington, 9, 1894, p. 91.—Beecher, Amer. Jour. Sci., 4th ser., 13, 1902, p. 167.—Raymond, Annals Carnegie Mus., 3, 1905, p. 375.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1051.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 319.—Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 70.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 724.—Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 527.

Observation.—Most of the above references are to *Ceraurus* in the broad sense.

CERAURUS (CYRTOMETOPUS) APOLLO Clarke. See *Anacheirurus apollo*.

CERAURUS BIMUCRONATUS Roemer. See *Cheirurus niagarensis*.

Ceraurus bispinosus Raymond and Barton.

Ceraurus bispinosus Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 536, pl. 1, figs. 3, 4.

Black River: Tetreauville, Quebec.

CERAURUS (PSEUDOSPHEREXOCHUS) CLINTONI Foerste. See *Pseudosphærexochus clintoni*.

CERAURUS CROSOTUS Locke. See *Odontopleura crosota*.

Ceraurus dentatus Raymond and Barton.

Ceraurus pleurexanthemus Hall (part), Pal. New York, 1, 1847, pl. 65, figs. 1d, h, i, m; pl. 66, figs. 1a-g.—Emmons, Geology 2d Dist. New York, 1842, p. 390, fig. 6; Amer. Geology, 1, 1855, pl. 15, figs. 1a, f, h, i, k.—Billings, Geol. Canada, 1863, p. 188, fig. 188.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 160, fig.—Miller, N. A. Geol. Pal., 1889, p. 538, fig. 984.—Cumings, 32d Ann. Rep. Indiana State Geol. Surv., 1908, pl. 54, figs. 9a-b (after Hall).—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 319, fig. 1632.

Ceraurus dentatus—Continued.

Ceraurus dentatus Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 534, pl. 1, fig. 1; pl. 2, figs. 4, 5.

Trenton: Middletown, etc., New York; Belleville, Coburg, Peterboro, Kirkfield, etc., Ontario.

Ceraurus elginensis Slocom.

Ceraurus elginensis Slocom, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 73, pl. 17, figs. 4-5.

Richmond (Maquoketa): Elgin and Bloomfield, Iowa.

CERAURUS (NIESZKOWSKIA) GLAUCUS Clarke. See *Nieszkowskia glaucus*.

Ceraurus granulosus Raymond and Barton.

Ceraurus pompilius Raymond (not Billings), Ann. Carnegie Mus., 3, 1905, pp. 365-6 (not fig. 6), pl. 14, fig. 14; 7th Rep. State Geol. Vermont, 1911, p. 240, pl. 36, fig. 14.

Ceraurus granulosus Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 536.

Chazy (Crown Point): Sloop Bay, Valcour Island, New York.

Ceraurus hudsoni Raymond.

Ceraurus hudsoni Raymond, Ann. Carnegie Mus., 3, 1905, p. 367, pl. 14, fig. 15, p. 375; 7th Rep. State Geol. Vermont, 1910, p. 240, pl. 36, fig. 15.—Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 535.

Ceraurus (Crotalocephalus) hudsoni Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 319.

Chazy (Crown Point): Sloop Bay, Valcour Island, New York.

CERAURUS HYDEI Weller. See *Cheirurus hydei*.

CERAURUS (ECCOPTOCHILE) ICARUS Clarke. See *Ceraurinus icarus*.

CERAURUS ICARUS Meek. See *Ceraurinus icarus*.

CERAURUS INSIGNIS Hall. See *Cheirurus niagarensis*.

CERAURUS MEEKANUS Miller. See *Ceraurinus icarus*.

CERAURUS (CYRTOMETOPUS) MERCURIUS Clarke. See *Pseudosphærexochus mercurius*.

Ceraurus milleranus Miller and Gurley.

?*Calymene bucklandii* Anthony, Amer. Jour. Sci., 36, 1839, p. 106, figs. 1, 2.

Ceraurus milleranus Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 3, 1893, p. 80, pl. 8, fig. 10.—Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 538, pl. 1, figs. 6-8, pl. 2, fig. 6.—Slocom, Field Mus. Nat. Hist., Geol. Ser. 4, 1913, p. 71, pl. 17, figs. 1-3.

Maysville (Corryville): Cincinnati, Ohio.

Observation.—*Calymene bucklandii* Anthony probably refers to this species, but the description and figures are too poor for accurate identification.

Ceraurus miseneri Foerste.

Ceraurus miseneri Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 228, pl. 4, fig. 7A, B.—Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 539.

Richmond (Whitewater): Richmond, Indiana; Dayton, Ohio.

CERAURUS NIAGARENSIS of authors. See *Cheirurus niagarensis*.

Ceraurus numitor (Billings).

Cheirurus numitor Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 27, fig. 11.

Ceraurus (Nieszkowskia) *numitor* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 738 (gen. ref.).

Ceraurus numitor Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 540. Richmond (English Head): English Head, Anticosti.

CERAURUS NUPERUS Miller. See *Cheirurus nuperus*.

CERAURUS (NIESZKOWSKIA) PERFORATOR Clarke. See *Nieszkowskia perforator*.

Ceraurus pleurexanthemus Green.

Ceraurus pleurexanthemus Green, Monthly Amer. Jour. Geol., 1, 1832, p. 560, pl. 4, fig. 10; Mon. Tril. N. A., 1832, p. 84, fig. 10, cast 33.—Hawle and Corda, Prodr. monogr. Bohem. trilobiten, 1847, p. 161, pl. 7, fig. 82.—Hall, Pal. New York, 1, 1847, p. 242, pl. 65, figs. 1a-c, 1e-g (not 1d, h, i, m nor pl. 66, fig. 1a-g=C. *dentatus*).—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 217, pl. 15, figs. 1b-1e, 1g (not 1a, h, i, k=C. *dentatus*).—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 3, fig. 7.—Hitchcock, Geol. Vermont, 1, 1862, p. 300, fig. 214.—Chapman, Canadian Jour., n. s., 8, 1863, p. 31, fig. 146; p. 201, fig. 197.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 3, 132.—Walcott, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pp. 89, 95; Mus. ed., 1879; Annals Lyc. Nat. Hist., New York, 11, 1876, p. 155, pl. 11; 31st Rep. New York State Mus. Nat. Hist., 1880, pp. 61, 66, pl. 1, figs. 3, 4; Bull. Mus. Comp. Zool., 8, 1881, pp. 191-216, pl. 1, figs. 1-5; pl. 2, figs. 1-4, 6, 8; pl. 3, figs. 2-7; pl. 4, figs. 1, 2, 4-6, 8, 8a; pl. 6, figs. 3-5; Science, 3, 1884; p. 279.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 123, figs.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, pp. 734, 738.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 174.—Ruedemann, Bull. New York State Mus., 49, 1902, p. 67.—Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 204, pl. 15, fig. 28.—?Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 71.—Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 528, pl. 1, fig. 1; pl. 2, figs. 1, 2, 7.—Ruedemann, Pal. Univ., Ser. 4, fasc. 1, 1913, pl. 236.

Cheirurus pleurexanthemus Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 236.

Black River and Trenton: Trenton Falls, etc., New York; New Jersey; Ohio; Tennessee; Minnesota; Canada; etc.

Plastotype.—Cat. No. 25696, U.S.N.M.

CERAURUS PLEUREXANTHEMUS Hall (part). See *Ceraurus dentatus*.

CERAURUS POLYDORUS Clarke. See *Ceraurinus polydorus*.

CERAURUS POMPILIUS Clarke. See *Ceraurinus pompilius*.

CERAURUS POMPILIUS Raymond. See *Ceraurus granulosus*.

CERAURUS (PSEUDOSPHEREXOCHUS) PROLIFICUS Clarke. See *Pseudosphærexochus vulcanus*.

CERAURUS? PUSTULOSUS Hall. See *Eoharpes pustulosus*.

CERAURUS RARUS Walcott. See *Encrinurus rarus*.

CERAURUS (SPHÆROCORYPHE) ROBUSTA Clarke. See *Sphærocoryphe robustus*.

CERAURUS (NIESZKOWSKIA) SATYRUS Clarke. See *Nieszkowskia satyrus*.

CERAURUS SCOFIELDI Miller. See *Ceraurinus scofieldi*.

Ceraurus?? solitarius (Billings).

Cheirurus solitarius Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 206.
Canadian (Beekmantown): Near St. Antoine above Quebec, Canada.

CERAURUS TARQUINIUS Miller. See *Cheirurus tarquinius*.

CERAURUS TRENTONENSIS Miller. See *Pseudosphærexochus trentonensis*.

CERAURUS VIGILANS Hall. See *Encrinurus vigilans*.

CERIONITES Meek and Worthen. Genotype: *Lunulites dactyloides* Owen.

Cerionites Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 346.—Miller, N. A. Geol. Pal., 1889, p. 156.

Cerionites dactyloides (Owen).

Lunulites? *dactyloides* Owen, Geol. Rep. Iowa, Wisconsin, Illinois, 1844, p. 69, pl. 13, fig. 4.

Lunulites dactyloides Kayser, Zeits. d. d. geol. Gesell., 27, 1875, p. 780.

Cerionites (*Pasceolus*) *dactyloides* Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 346, pl. 5, fig. 2.

Cerionites dactyloides Whitfield, Geol. Wisconsin, 4, 1882, p. 267, pl. 13, figs. 1-3.—Miller, N. A. Geol. Pal., 1889, p. 156, fig. 97.—Calvin, Proc. Iowa Acad. Sci., 1, pt. 3, 1893, p. 13; Amer. Geol., 12, 1893, pp. 53-57, fig.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895 (ext. 1893), p. 67.

Pasceolus? *dactyloides* Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 345, pl. 5, figs. 2a-c.

Cyclocrinus dactyloides Stolley, Archiv. f. Anthrop. u. Geol. Schleswig-Holsteins, 1, Heft 2, 1896, p. 215 (gen. ref.).

Niagaran: Carroll County, Illinois; Iowa; Wisconsin.

CERIOPIORA CONSTELLATA Van Cleve. See *Constellaria constellata*.

Ceromyopsis Meek.

Genotype: *Cardiomorpha obliquata* Meek.

Ceromyopsis Meek, Proc. Acad. Nat. Sci. Philadelphia, 1872, p. 327; Geol. Surv. Ohio, Pal., 1, 1873, p. 146.

Ceromyopsis obliquata Meek.

Cardiomorpha?? obliquata Meek, Proc. Acad. Nat. Sci. Philadelphia, 1872, p. 327 (*Ceromyopsis* n. gen. suggested); Geol. Surv. Ohio, Pal., 1, 1873, p. 146, pl. 12, figs. 4a, b.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 220.

Maysville: Cincinnati, Ohio.

Observation.—No additional specimens of this species have been found. The type is probably a compressed *Cuneamya*.

CHÆNODOMUS Ulrich. See *Cymatona* Ulrich.

CHÆTETES Fischer.

Genotype: *C. radians* Fischer.

Chætetes Fischer, Oryct. du Gouv. Moscou, 1837, p. 159.—Nicholson, Pal. Tab.

Corals, 1879, p. 260.—Rominger, Amer. Geol., 10, 1892, p. 56.—Zittel-Eastman Textb. Pal., 1, 1900, p. 102; *ibid.*, 2d ed., 1913, p. 117.

Not *Chætetes* of many authors, who have used the name for bryozoa.

CHÆTETES APPROXIMATUS Nicholson. See *Hallopora dalei*.

CHÆTETES (MONOTRYPELLA) ARBUSCULUS Hall and Simpson. See *Monotrypella?* *arbuscula*.

Chaetetes arcticus Haughton.

Chaetetes arcticus Haughton, Jour. Royal Soc. Dublin, 1, 1857, p. 246, pl. 10, figs. 3, 4.

Silurian: Beechy Island, Arctic America.

Observation.—Not recognizable. Refers to some species of *Favosites*.

CHAETETES ATTRITUS Nicholson. See *Dekayia aspera*.

CHAETETES BRIAREUS Nicholson. See *Eridotrypa briareus*.

CHAETETES CALYCVLUS James. See *Aspidopora calycula*.

CHAETETES CINCINNATIENSIS James. See *Monticulipora cincinnatiensis*.

CHAETETES? *CLATHRATULUS* Nicholson. See *Escharopora pavonia*.

CHAETETES CLAVACOIDEUS James. See *Leptotrypa clavacoidea*.

CHAETETES COLUMNARIS Hall. See *Tetradium columnare*.

CHAETETES COMPRESSUS Ulrich. See *Peronopora compressa*.

CHAETETES CONSIMILIS Hall. See *Monotrypella? consimilis*.

CHAETETES CONSTELLATUS Quenstedt. See *Constellaria florida*.

CHAETETES CORTICANS Nicholson. See *Spatiopora corticans*.

Chaetetes crustulatus James.

Chaetetes crustulatus James, Paleontologist, No. 1, 1878, p. 1; No. 3, 1879, p. 20.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 202.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 30.

Monticulipora crustulata James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 23, pl. 1, figs. 2, 2a; 18, 1895, p. 82.

Cincinnati: Cincinnati, Ohio.

Observation.—A variety of forms was included under this name, many of which have since been given other names. The type is lost and the description is so general that it can not be narrowed down to one recognizable form; hence, in the interests of science, the name has been dropped.

CHAETETES DALEI Milne-Edwards and Haime. See *Hallopora dalei*.

CHAETETES DALEI Nicholson. See *Hallopora ramosa*.

CHAETETES DECIPIENS Rominger. See *Peronopora decipiens*.

CHAETETES DELICATULUS Nicholson. See *Bythopora delicatula*.

CHAETETES DISCOIDEUS James. See *Amplexopora? discoidea*.

CHAETETES ELEGANS Ulrich. See *Discotrypa elegans*.

CHAETETES EXPANSUS Ringueberg. See *Orbignyella expansa*.

CHAETETES FILIASUS Milne-Edwards and Haime. See *Amplexopora filiosa*.

CHAETETES FLETCHERI Nicholson. See *Dekayella ulrichi*.

CHAETETES FRONDOSUS Milne-Edwards and Haime. See *Heterotrypa frondosa*.

CHAETETES FRONDOSUS Nicholson. See *Peronopora decipiens*.

CHAETETES FRONDOSUS LIMATUS Quenstedt. See *Heterotrypa frondosa*.

CHÆTETES FRUTICOSUS Hall. See *Monotrypella?* *arbuscula*.

CHÆTETES FUSIFORMIS Whitfield. See *Lioclemella fusiformis*.

CHÆTETES GRACILIS James. See *Bythopora gracilis*.

CHÆTETES GRANULIFERUS Ulrich. See *Homotrypella granulifera*.

CHÆTETES IMPLICATA Ulrich. See *Batostoma implicatum*.

CHÆTETES IRREGULARIS Ulrich. See *Stigmatella irregularis*.

CHÆTETES JAMESI Nicholson. See *Batostoma jamesi*.

CHÆTETES LÆVIRAMUS Quenstedt. See *Bythopora gracilis*.

Chætetes lycoperdon (Say) Hall.

Chætetes lycoperdon (Say MS.) Hall, Pal. New York, 1 1847, pp. 48, 64, 276; *ibid.*, II, 1852, p. 40.

Chætetes (Monticulipora) *lycoperdon* Chamberlin, Geol. Wisconsin, 1, 1883, p. 153, fig.

Chætetes lycopodites James, Paleontologist, No. 3, 1879, p. 20.

Favosites Lycoperdon Owen, Amer. Jour. Sci. and Arts, 47, 1844, p. 363, fig. 3. Ordovician: Various localities.

Observation.—Not recognized. The term *lycoperdon* was never properly defined and has been applied to many species of bryozoa, especially if they were hemispheric or globose in shape.

CHÆTETES LYOPODITES James. See *Chætetes lycoperdon* James.

CHÆTETES MAMMULATUS of authors. See *Monticulipora mammulata*, *M. epidermata* and *Heterotrypa frondosa*.

CHÆTETES MEEKI James. See *Bythopora meeki*.

CHÆTETES MINUTUS James. See *Bythopora arctipora*.

CHÆTETES NEWBERRYI Nicholson. See *Aspidopora newberryi*.

CHÆTETES NODULOSUS Nicholson. See *Hallopora nodulosa*.

CHÆTETES? ONEALLI James. See *Hallopora onealli*.

CHÆTETES ORTONI Nicholson. See *Atactoporella ortonii*.

Chætetes papillatus Nicholson (not McCoy).

Chætetes papillatus Nicholson (not McCoy), Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 513, pl. 29, figs. 12–12b; Pal. Ohio, 2, 1875, p. 210.—Nickles and Bassler, Bull. U. S. Geol. Surv. 173, 1900, p. 205.

Ordovician: Cincinnati, Ohio.

Observation.—The form so referred to can not be identified with certainty from Nicholson's description and figures, but it was probably a species of *Petigopora*, possibly the *P. asperula* Ulrich.

CHÆTETES PAVONIA Milne-Edwards and Haime. See *Escharopora pavonia*.

Chætetes perantiquus Whiteaves.

Chætetes perantiquus Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 238, figs. 17, 18, 19.

Black River or Richmond: Lower Fort Garry, Manitoba.

CHÆTETES PETECHIALIS Nicholson. See *Petigopora petechialis*.

CHÆTETES PETROPOLITANA Nicholson (part). See *Mesotrypa whiteavesi*.

CHÆTETES PETROPOLITANA James. See *Amplexopora petasiformis*.

CHÆTETES PETROPOLITANUS Lonsdale. See *Dianulites petropolitana*.

Chætetes petropolitanus of authors (not Pander).

Chætetes petropolitanus Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 304, pl. 2, figs. 8a, b.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 373.

Monticulipora petropolitana Emmons, Amer. Geology, 1, pt. 2, 1855, p. 229, fig. 80. Ordovician: Various localities.

Observation.—These references are to undetermined species probably different from *Chætetes* (now *Dianulites*) *petropolitana* Pander.

CHÆTETES PULCHELLUS Nicholson. See *Hallopora andrewsi*.

CHÆTETES QUADRATUS Rominger. See *Rhombotrypa quadrata*.

CHÆTETES RAMOSUS Milne-Edwards and Haime. See *Hallopora ramosa*.

CHÆTETES RHOMBICUS Nicholson. See *Rhombotrypa quadrata*.

Chætetes?? *rugosus* Hall.

Chætetes rugosus Hall., Pal. New York, 1, 1847, p. 67, pl. 24, figs. 2a, b.

Trenton: Middleville, Herkimer County, New York.

Observation.—Possibly a species of *Batostoma*, but the generic position can not be determined from the description and figures given.

CHÆTETES RUGOSUS Milne-Edwards and Haime. See *Hallopora rugosa*.

CHÆTETES SIGILLARIOIDES Nicholson. See *Hallopora onealli sigillarioides*.

CHÆTETES SUBGLOBOSUS Ulrich. See *Monotrypa subglobosa*.

CHÆTETES SUBPULCHELLUS Nicholson. See *Heterotrypa subpulchella*.

CHÆTETES SUBROTUNDUS James. See *Hindia subrotundus*.

CHÆTETES TUBERCULATUS Milne-Edwards and Haime. See *Spatiopora tuberculata*.

CHÆTETES TUBERCULATUS Nicholson. See *Spatiopora corticans*.

Chætetes turbinatum James.

Not recognized.

Chætetes turbinatum James, Paleontologist, No. 2, 1878, p. 11.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 31 (gives discussion of species).

Monticulipora turbinata James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 161, pl. 2, figs. 1a-c.—J. F. James, *ibid.*, 15, 1893, p. 158.

Cincinnati: Cincinnati, Ohio.

CHÆTETES UNDULATUS Nicholson. See *Monotrypa undulata*.

CHÆTETES VARIANS James. See *Batostoma varians*.

CHÆTETES VENUSTUS Ulrich. See *Crepidopora venusta*.

CHÆTOCLADUS Whitfield.

Genotype: *C. plumula* Whitfield.

Chætocladius Whitfield, Bull. Amer. Mus. Nat. Hist., 16, 1894, p. 356.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 721.—Ruedemann, Bull. New York State Mus., 133, 1909, p. 204.

Chætocladius plumula Whitfield.

Chætocladius plumula Whitfield, Bull. Amer. Mus. Nat. Hist., 6, 1894, p. 356, pl. 11, figs. 11-13; Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, pl. 4, figs. 11-13.—Ruedemann, Bull. New York State Mus., 133, 1909, p. 204, figs. 11-13.

Black River (Platteville): Platteville, Wisconsin.

Chaetocladus sardesoni Ruedemann.

Chaetocladus sardesoni Ruedemann, Bull. New York State Mus., 133, 1909, p. 204, pl. 2, figs. 3-11.

Black River (Platteville): Minneapolis, Minnesota.

CHÆTOMORPHA Kuntze. A genus of recent marine algae.**Chaetomorpha?** *prima* Whitfield.

Oldhamia fruticosa Hall (part), Canadian Organic Remains, dec. 2, 1865, p. 50.

Chaetomorpha? prima Whitfield, Bull. Amer. Mus. Nat. Hist., 6, 1894, p. 355, pl. 11, figs. 9, 10; Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, pl. 4, figs. 9, 10.—

Ruedemann, New York State Mus., Bull. 133, 1909, p. 203, figs. 9, 10.

Black River (Platteville): Platteville, Wisconsin.

CHALAZODES Parks. See *Lophiostroma* Nicholson.**CHARIONELLA?** *HYALE* Billings. See *Whitfieldella hyale*.**CHASMATOPOREA** Eichwald.

Genotype: *C. tenella* Eichwald.

Retepora as applied by various authors to Ordovician and Silurian anastomosing bryozoa (not Lamarck, 1801).

Gorgonia? Hall, Pal. New York, 1, 1847, pp. 16, 76 (not Linnaeus, 1745).

Intricaria Hall, Pal. New York, 1, 1847, p. 77.—Miller and Dyer, Contr. Pal., No. 2, 1878, p. 7.

Subretepora D'Orbigny, Prodr. Pal., 1, 1850, p. 22.—Miller, N. A. Geol. Pal., 1889, p. 326. (See Geol. Surv. Illinois, 8, pp. 683, 687.)

Chasmatopora Eichwald, *Lethæa Rossica*, 1, 1860, p. 370.—Pocta, Syst. Sil. Centre Boheme, 8, 1894, pt. 1, p. 27.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 169; Zittel-Eastman Textb. Pal., 1913, p. 340.

Phyllopora (in part) Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 150.

Nov. gen. (not named) Ulrich, Contr. Amer. Pal., 1, 1886, p. 5.

Phylloporina (Ulrich) Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 150.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 399, 639; Geol. Minnesota, 2, 1893, p. 208.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 17.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 283.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 37.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 168; Bull. New York State Mus., 45, 1901, p. 168.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 48.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 140.

Chasmatopora angulata (Hall).

Retepora angulata Hall, Pal. New York, 2, 1852, p. 49, pl. 19, figs. 3a-h.—Hall and Whitfield, Pal. Ohio, 2, 1875, p. 111, pl. 5, figs. 2-4; 12th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 269, pl. 14, figs. 1, 2.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 861, figs.

Phylloporina angulata Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 151; 3, 1888, pl. 15, fig. 1; Geol. Surv. Ohio, 7, 1895, p. 600, pl. 28, fig. 1.

Subretepora angulata Miller, N. A. Geol. Pal., 1889, p. 326, fig. 523.

Retepora daytonensis Hall and Whitfield, Geol. Surv. Ohio, Pal. 2, 1875, p. 111 (proposed at end of description).

Early Silurian: Sodus and Rochester, New York (Clinton); Flamborough Head, etc., Ontario (Cataract); Dayton, etc., Ohio; Kentucky; Tennessee; and Alabama; (Brassfield); West Ellis Bay, Anticosti (Ellis Bay).

Chasmatopora aspera (Hall).

Gorgonia? aspera Hall, Pal. New York, 1, 1847, p. 16, pl. 4, figs. 3a, b.

Subretepora aspera Miller, N. A. Geol. Pal., 1889, p. 326.

Chasmatopora aspera—Continued.

Phylloporina aspera Ulrich, Geol. Surv. Illinois, 8, 1890, p. 332, pl. 53, figs. 4–4c.

Fenestella aspera Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 69 (gen. ref.).

Chazyan: Chazy, New York; Mingan Islands, Quebec (Mingan).

Plesiotype.—Cat. No. 43438, U.S.N.M.

Chasmatopora asperatostrata (Hall).

Retepora asperato striata Hall, Pal. New York, 2, 1852, p. 161, pl. 40C, figs. 2a–h.

Subretepora asperato-striata Miller, N. A. Geol. Pal., 1889, p. 326.

Phylloporina asperato striata Ulrich, Geol. Surv. Illinois, 8, 1890, p. 332, pl. 53, figs.

5, 5b.—Grabau, Bull. New York State Mus., 45, 1901, p. 169, fig. 68; Bull.

Buffalo Soc. Nat. Sci., 7, 1901, p. 169, fig. 68.—Bassler, Bull. U. S. Geol. Surv.,

292, 1906, p. 48, pl. 18, figs. 1–5.—Grabau and Shimer, N. A. Index Fossils, 1,

1907, p. 141, fig. 196.

Clinton: Lockport, Rochester, Niagara Falls, etc., New York; Grimsby, Thorold, and Hamilton, Ontario (Rochester); Osgood, Indiana (Osgood).

Plesiotype.—Cat. No. 43441, U.S.N.M.

Chasmatopora clathrata (Miller and Dyer).

Intricaria clathrata Miller and Dyer, Contr. Pal., No. 2, 1878, p. 7, pl. 3, figs. 5, 5a.

Subretepora clathrata Miller, N. A. Geol. Pal., 1889, p. 326.

Phylloporina clathrata Ulrich, Geol. Surv. Illinois, 8, 1890, p. 639.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity; central Tennessee.

Chasmatopora corticosa Ulrich.

Phyllopora? corticosa Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 61.

Subretepora corticosa Miller, N. A. Geol. Pal., 1889, p. 326.

Phylloporina corticosa Ulrich, Geol. Surv. Illinois, 8, 1890, p. 639, pl. 53, figs. 3,

3a; Geol. Minnesota, 3, 1893, p. 212, pl. 5, figs. 1–10.—Sardecson, Jour. Geol.,

9, 1901, p. 162, pl. B, figs. 11, 12.—Cumings, Amer. Jour. Sci., 4th ser., 20,

1905, pl. 6, fig. 33; Bull. Geol. Soc. Amer., 23, 1912, p. 369, pl. 21, fig. 29.

Black River (Decorah): Goodhue County and St. Paul, Minnesota; Wisconsin.

Cotypes.—Cat. No. 43437, U.S.N.M.

Chasmatopora dawsoni (Ulrich).

Phylloporina dawsoni Ulrich, Geol. Surv. Illinois, 8, 1890, p. 331, pl. 54, figs. 1–1i.

Subretepora dawsoni (Ulrich, in press), Miller, N. A. Geol. Pal., 1889, p. 326.

Trenton: Montreal, Canada; Chimney Point, Vermont.

Cotypes.—Cat. No. 43439, U.S.N.M.

Chasmatopora fenestrata (Hall).

Retepora fenestrata Hall, 3d Ann. Rep. New York State Cab. Nat. Hist., 1850, p. 178, pl. 2, figs. 1a–e.

Subretepora fenestrata Miller, N. A. Geol. Pal., 1889, p. 326.

Phylloporina fenestrata Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 352 (gen. ref.).—Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 143,

pl. 7, fig. 6.

Retepora Trentonensis Nicholson, Geol. Mag., n. s., 2, 1875, p. 37, pl. 2, figs. 4–4b; Pal. Prov. Ontario, 1875, p. 15, pl. 2, figs. 4–4b.

Phylloporina trentonensis Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 47, Geol. Surv. Illinois, 8, 1890, p. 640, pl. 53, figs. 1–1c.—Whiteaves, Pal.

Foss., 3, 1897, p. 162.

Chasmatopora fenestrata—Continued.

Subretepora trentonensis Miller, N. A. Geol. Pal., 1889, p. 326.

Trenton: Lowville, New York; Peterboro, Ontario; St. Andrews, Manitoba; New Jersey.

Plesiotype.—Cat. No. 43440, U.S.N.M. (Ulrich).

Chasmatopora gracilis (Hall).

Retepora gracilis Hall, Pal. New York, 1, 1847, p. 15, pl. 4, figs. 2, 2a.

Fenestella gracilis Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 74 (gen. ref.).

Subretepora gracilis Miller, N. A. Geol. Pal., 1889, p. 326.

Chazy: Chazy, New York.

Chasmatopora granistriata (Ulrich).

Phylloporina granistriata Ulrich, Geol. Surv. Illinois, 8, 1890, p. 639, pl. 29, figs. 3, 3a.

Upper Medinan (Girardeau): Alexander County, Illinois.

Richmond (Charleton): Anticosti.

Chasmatopora halli (Ulrich).

Phylloporina halli Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 181, fig. 7; Geol. Minnesota, 3, 1893, p. 211, pl. 4, figs. 16-21.

Black River (Decorah): St. Paul, Minnesota.

Cotypes.—Cat. No. 43696, U.S.N.M.

Chasmatopora incepta (Hall).

Retepora incepta Hall, Pal. New York, 1, 1847, p. 15, pl. 4, figs. 1a, b.

Fenestella incepta Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 74, (gen. ref.).

Subretepora incepta Miller, N. A. Geol. Pal., 1889, p. 326.

Phylloporina incepta Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 352.

Chazy: Chazy, Clinton County, New York.

Chasmatopora reticulata (Hall).

Intricaria? reticulata Hall, Pal. New York, 1, 1847, p. 77, pl. 26, figs. 8a-c.—

Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 158, fig. 123.—Lesley,

Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 300, figs.

Subretepora reticulata Emmons, Amer. Geology, 1, pt. 2, 1855, p. 206, pl. 7, figs.

8a, 8b, c.—Miller, N. A. Geol. Pal., 1889, p. 326, fig. 524.

Phylloporina reticulata Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 332, 639, pl. 53, figs. 2, 2a; Geol. Minnesota, 3, 1893, p. 210, pl. 4, figs. 8-15.—Grabau and Shi-

mer, N. A. Index Fossils, 1, 1907, p. 141, fig. 201a.

Chasmatopora reticulata Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 170, 171, fig. 86.

Black River and Trenton: Watertown, etc., New York; Vermont; Minnesota; Canada.

Ordovician (Wassaleu): Uxnorm, Esthonia, Russia.

Plesiotypes.—Cat. Nos. 43731-43733, U.S.N.M.

Chasmatopora subblaxa (Ulrich).

Phylloporina subblaxa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 179, fig. 6; Geol. Minnesota, 3, 1893, p. 209, pl. 4, figs. 1-7.

Chasmatopora subblaxa Bassler, Zittel-Eastman Textb. Pal., 1913, p. 340, fig. 497. Stones River (Pierce and Lebanon): Lebanon, Laverne, and Murfreesboro, Tennessee.

Chasmatopora sublara—Continued.

Black River (Decorah): Minneapolis, Minnesota.

Chazyan (Mingan): Mingan Islands, Quebec.

Cotypes.—Cat. Nos. 43697, 43698, U.S.N.M.

Chasmatopora variolata (Ulrich).

Phyllopora variolata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 160, pl. 6, fig. 14.

Subretepora variolata Miller, N. A. Geol. Pal., 1889, p. 326 (gen. ref.).

Phylloporina variolata Ulrich, Geol. Surv. Illinois, 8, 1890, p. 639 (gen. ref.).

Eden (McMicken): Cincinnati, Ohio, and vicinity.

Holotype.—Cat. No. 43704, U.S.N.M.

CHASMOPS McCoy.

Genotype: *Calymene odini* Eichwald.

Chasmops McCoy, Ann. Mag. Nat. Hist., 2d ser., 4, 1849, p. 399; British Pal.

Rocks and Fossils, 1854, p. 163; Cont. Brit. Pal., 1854, p. 141, fig.—Roemer,

Zeits. d. d. geol. Gesell., 11, 1859, p. 563 footnote.—Salter, Mon. British

Tril., Pal. Soc., 1864, pp. 15, 36.—Schmidt, Mem. Acad. Imp. Sci. St. Peters-

burg, 7th ser., 30, 1881, pp. 62, 67, 94.—Zittel, Handb. Pal., 2, 1885, p. 615.—

Hall and Clarke, Pal. New York, 7, 1888, p. xxxiv, fig.—Oehlert, Bull. Soc.

Geol. France, 3d ser., 17, 1889, p. 759.—Reed, Geol. Mag., dec. 4, 1, 1894, p.

241.—Koken, Die Leitfossilien, Leipzig, 1896, p. 32, fig. 22.—Beecher, Amer.

Jour. Sci., 4th ser., 3, 1897, p. 105, pl. 3, fig. 31.—Lindstrom, Kongl. Sven.

Vet.-Akad. Handl. 34, No. 8, 1901, pp. 27, 49.—Jaekel, Zeits. d. d. geol.

Gesell., 53, 1901, p. 157.

Chasmops anticosi (Billings).

Dalmanites Anticosiensis Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 61.

Richmond (Charleton) and Gamachian (Ellis Bay): Junction Cliff, etc., Anticosti.

Chasmops breviceps (Hall).

Dalmania breviceps Hall, Desc. n. sp. Crin. etc., 1866, p. 16; Desc. n. sp. Fossils,

Cincinnati, Ohio, 1871, pl. 4, figs. 15, 16; 24th Rep. New York State Cab.

Nat. Hist., 1872, p. 223, pl. 8, figs. 15, 16.—Hall and Whitfield, Geol. Surv.

Ohio, Pal., 2, 1875, p. 108, pl. 4, figs. 16, 17.

Dalmanites breviceps Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 143.—Cum-

ings, 32d. Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1059, pl. 54, figs.

10, 10a.

Dalmanites (Chasmops) breviceps Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 734.

Richmond (Waynesville and Liberty): Lebanon, etc., Ohio; Madison, Indiana.

CHASMOPS TROOSTI Safford and Vogdes. See *Pterygomotopus troosti*.

CHAUNOGRAPTUS Hall.

Genotype: *Dendrograptus novellus* Hall.

Chaunograptus (subgenus of *Dendrograptus*) Hall, 11th Ann. Rep. Dep. Geol.

Nat. Hist. Indiana, 1882, p. 225.—Ruedemann, Mem. New York State

Mus., 11, pt. 2, 1908, p. 223.

Chaunograptus gemmatus Ruedemann.

Chaunograptus gemmatus Ruedemann, Mem. New York State Mus., 11, pt. 2,

1908, pp. 226, 227, fig. 120, pl. 10, fig. 11; pl. 11, fig. 7.

Trenton (Canajoharie): Dolgeville, Herkimer County, New York.

Eden (Economy): Covington, Kentucky.

Plenotype: Cat. No. 54270 U.S.N.M.

Chaunograptus novellus (Hall).

Dendrograptus (*Chaunograptus*) *novellus* Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 225, pl. 1, figs. 1, 2; Trans. Albany Inst., 10, 1883, p. 58 (abstract 1879, p. 2).—Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 570; Bull. Mus. Univ. State Missouri, 1, 1884, p. 20.

Chaunograptus novellus Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 41 (gen. ref.); Mem. New York State Mus., 11, pt. 2, 1908, p. 225, pl. 10, fig. 10; pl. 11, fig. 5.

Niagaran (Waldron): Waldron, Indiana.

Chaunograptus? rectilinea Ruedemann.

Chaunograptus? rectilinea Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 227–228, fig. 121, pl. 10, fig. 12.

Trenton (Snake Hill): Van Schaick Island, Cohoes, New York.

CHEILOPORELLA Ulrich. See *Chiloporella* Ulrich.

CHEILOTRYPA Ulrich. See *Chilotrypa* Ulrich.

CHEIROCRINUS Eichwald.

Genotype: *C. penniger* Eichwald.

Cheirocrinus Eichwald, Bull. Soc. Imp. Nat. Moscou, 29, pt. 1, 1856, p. 123 (reprint, 1857, p. 69); *Lethæa Rossica*, livr. 5, 1859, p. 645.—Bather, Treatise on Zool., 3, *Echinoderma*, 1900, p. 63; Trans. Roy. Soc. Edinburgh, 49, pt. 2, 1913, p. 434.

Glyptocystites Billings (part), Geol. Surv. Canada, Rep. Prog., 1857, p. 280.—Chapman, Canadian Jour. n. s., 2, 1857, p. 303.—Billings, Canadian Org. Rem., dec. 3, 1858, p. 53.—Hall, Pal. New York, 3, 1859, p. 151.—Schmidt, Mem. Acad. Imp. Sci. St. Petersburg, 7th ser., 21, No. 2, 1874, p. 8.—Zittel, Handb. Pal., 1, 1879, p. 423.

Glyptocystis Angelin, Icon. Crin. Suec., 1878, p. 31.—Carpenter, Jour. Linn. Soc. Zool., 24, 1891, pp. 11, 12.—Haeckel (part), *ibid.*, 1896, p. 150.

Homocystites Barrande (part), Sil. Syst. Centre Boheme, 7, pt. 1, 1887, pp. 77, 160.

Homocystis Carpenter, Journ. Linn. Soc. Zool., 24, 1891, p. 13.—Haeckel, Amphor. und Cyst., 1896, p. 149.—Bather, Treatise on Zool., 3, *Echinoderma*, 1900, p. 64.

Chirocrinus Jaekel, Stammesg. Pelmat., 1, 1899, p. 212.

Cheirocrinus anatifomis (Hall).

Echino-enocrinites anatifomis Hall, Pal. New York, 1, 1847, pp. 89, 318, pl. 29, fig. 4a–f; 12th Rep. New York State Cab. Nat. Hist., 1860, p. 68.

Glyptocystites anatifomis Miller, N. A. Geol. Pal., 1889, p. 269 (gen. ref.).

Chirocrinus anatifomis Jaekel, Stammesg. Pelmat., 1, 1899, p. 221.

Trenton: Turin, Lewis County, New York.

Cheirocrinus angulatus (Wood).

Cyathocrinites sculptus Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 61 (nom. nud.).

Cyathocrinus sculptus Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 364 (gen. ref.).

Chirocrinus angulatus Wood (not *Chirocrinus sculptus* Schmidt), Bull. U. S. Nat. Mus., 64, 1909, p. 7, pl. 8, figs. 9, 10.

Chazyan (Ottoese): Knoxville, Tennessee.

Holotype: Cat. No. 39951 U.S.N.M. (Troost's type of *C. sculptus*.)

CHEIROCRINUS CHRYSALIS Hall. See *Eucheirocrinus chrysalis*.

Cheirocrinus forbesi (Billings).

Glyptocystites forbesi Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 283; Geol. Surv. Canada, dec. 3, 1858, p. 59, pl. 4, figs. 3a-3b.—Chapman, Expos. Min. Geol. Canada, 1864, p. 109.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 463.

Cheirocrinus Forbesi Jaekel, *Stammesges. der Pelmat.*, 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 221.

Cheirocrinus forbesi Bather, Trans. Royal Soc. Edinburgh, 49, pt. 2, 1913, p. 441 (gen. ref.).

Chazyan (Aylmer): Caughnawaga, Quebec.

Cheirocrinus logani (Billings).

Glyptocystites logani Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 282; Geol. Surv. Canada, dec. 3, 1858, p. 57, pl. 4, figs. 1a-1j.—Chapman, Canadian Jour., n. s., 6, 1861, p. 514, fig. 85; 8, 1863, p. 198, fig. 179; Expos. Min. Geol. Canada, p. 108, fig. 85; pp. 109, 170, fig. 179.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 464.

Glyptocystis logani Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 45 (loc. occ.).

Cheirocrinus logani Jaekel, *Stammesg. Pelmat.*, 1, Thecoidea u. Cystoidea, 1899, p. 220.

Cheirocrinus logani Bather, Trans. Roy. Soc. Edinburgh, 49, pt. 2, p. 441 (gen. ref.).

Trenton (Curdsville): Island of Montreal and Kirkfield, Canada.

Cheirocrinus logani gracilis (Billings).

Glyptocystites logani var. *gracilis* Billings, Geol. Surv. Canada, dec. 3, 1858, p. 59, pl. 4, fig. 2.

Glyptocystites gracilis Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 373.

Trenton: Montreal, Quebec.

CHEIROCRINUS STIGMATUS Hall. See *Deltacrinus stigmatus*.

Cheirocrinus walcotti (Jaekel).

Cheirocrinus Walcottii Jaekel, *Stammesg. Pelmat.*, 1, Thecoidea u. Cystoidea, 1899, p. 221, pl. 11, fig. 8.

Trenton: Trenton Falls, New York.

CHEIRURUS Beyrich.

Genotype: *C. exsul* Beyrich.

Cheirurus Beyrich, Ueber einige böhmische Tril., 1845, p. 5.—Hawle and Corda, Abh. d. k. böhmischen Gesell. d. Wiss., 5 (extract), 1847, p. 133, pl. 6, fig. 70.—Salter, Mem. Geol. Surv. United Kingdom, dec. 7, 1853, pp. 1, 9.—Pictet, *Traite Pal.*, 2d ed., 2, 1854, p. 519.—Nieszkowski, *Archiv. f. Naturk. Liv.-Ehst.-u. Kurl*, 1, 1857, p. 588.—Salter, *Mon. Brit. Tril. Pal. Soc.*, 1864, pp. 60, 61.—Angelin, *Pal. Scandinavica*, 3d ed., *Holmiae*, 1878, p. 31.—Schmidt, *Mem. l'Acad. Imp. Sci. St. Petersburg*, 7th ser., 30, 1881, pp. 122, 125, 126, 132.—Zittel, *Handb. Pal.*, 2, 1885, pp. 616, 617.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 34.—Beecher, *Amer. Jour. Sci.*, 4th ser., 3, 1897, p. 105, pl. 3, fig. 28; Zittel-Eastman *Textb. Pal.*, 1, 1900, p. 635.—Raymond, *Ann. Carnegie Mus.*, 3, 1905, p. 373; Zittel-Eastman *Textb. Pal.*, 2d ed., 1913, p. 724.

CHEIRURUS APOLLO Billings. See *Anacheirurus apollo*.

CHEIRURUS ERYX Billings. See *Pseudosphærexochus eryx*.

CHEIRURUS GLAUCUS Billings. See *Nieszkowskia glaucus*.

Cheirurus hydei (Weller).

Ceraurus hydei Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 264, pl. 24, fig. 22.

Cheirurus hydei Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 542 (gen. ref.)

Niagaran (Racine): Near Lemont, Illinois.

CHEIRURUS ICARUS Billings. See *Ceraurinus icarus*.

CHEIRURUS MARS Hudson. See *Nieszkowskia mars*.

CHEIRURUS MERCURIUS Billings. See *Pseudosphærexochus mercurius*.

Cheirurus niagarensis (Hall).

Ceraurus insignis Hall (not Beyrich), Pal. New York, 2, 1852, pp. 300, 303, pl. 66A, fig. 4; pl. 67, figs. 9, 10; Geol. Surv. Wisconsin, 1, 1862, p. 433; adv. sheets 18th Rep. New York State Cab. Nat. Hist., 1865, p. 31; 20th Rep. New York State Cab. Nat. Hist., 1867, p. 335.

Ceraurus bimucronatus Roemer (not Murchison), Sil. Fauna West Tennessee, 1860, p. 80, pl. 5, fig. 19.

Sphærexochus romingeri? Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 32, fig. 16.

Ceraurus niagarensis Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 376, pl. 21, figs. 10, 11; rev. ed. 1870, p. 427, pl. 21, figs. 10, 11; 11th Rep. Dep. Geol. Nat. Hist. Surv. Indiana, 1882, p. 335, pl. 34, fig. 16; pl. 33, fig. 10.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 195, fig.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 1, 1884, p. 42; pt. 2, 1895, p. 107.—Van Ingen, School of Mines Quart., 23, 1901, p. 35.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 263, pl. 24, figs. 20-21.

Ceraurus (*Cheirurus*) *niagarensis* Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 189, pl. 32, fig. 16.

Ceraurus (*Crotalocephalus*) *niagarensis* Kindle, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 483, pl. 23, figs. 1-2; pl. 24, fig. 8.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 319, fig. 1633.

Cheirurus niagarensis Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 542 (gen. ref.).

Niagaran (Rochester to Guelph): Rochester, etc., New York; Ontario; Indiana; Tennessee; Wisconsin; Illinois; etc.

CHEIRURUS NUMITOR Billings. See *Ceraurus numitor*.

Cheirurus nuperus Billings.

Cheirurus nuperus Billings, Cat. Sil. Fossils Anticosti, Geol. Surv. Canada, 1866, p. 60, fig. 20.

Ceraurus nuperus Miller, N. A. Geol. Pal., 1889, p. 538 (gen. ref.).

Anticostian (Gun River—Chicotte): East Point, etc., Anticosti.

CHEIRURUS PERFORATOR Billings. See *Nieszkowskia perforator*.

CHEIRURUS PLEUREXANTHEMUS Billings. See *Ceraurus pleurexanthemus*.

CHEIRURUS POLYDORUS Billings. See *Ceraurinus polydorus*.

CHEIRURUS POMPILIUS Billings. See *Ceraurinus pompilius*.

CHEIRURUS PROLIFICUS Billings. See *Pseudosphærexochus vulcanus*.

CHEIRURUS SATYRUS Billings. See *Nieszkowskia satyrus*.

CHEIRURUS SOL Billings. See *Heliomera sol*.

CHEIRURUS SOLITARIUS Billings. See *Ceraurus solitarius*.

Chelrurus tarquinius Billings.

Cheirurus Tarquinius Billings, Proc. Portland Soc. Nat. Hist., 1, 1863, p. 121, pl. 3, fig. 22.

Ceraurus tarquinius Miller, N. A. Geol. Pal., 1889, p. 538 (gen. ref.).—Whiteaves, Ann. Rep. Geol. Surv. Canada, n. s., 14, App. F, 1904, p. 59; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 267.

Silurian: Port Daniel, Bay of Chaleur, Quebec; Masardis, Maine.

CHEIRURUS VULCANUS Billings. See *Pseudosphærexochus vulcanus* and *Nieszkowskia billingsi*.

CHIASTOCLONELLA Rauff.

Genotype: *C. headi* Rauff.

Chiastoclonella Rauff, Palæontographica, 41, 1895, p. 244.

Chiastoclonella headi Rauff.

Chiastoclonella Headi Rauff, Palæontographica, 41, 1895, p. 244, figs. 98-102, p. 117, figs. 5-7; pl. 18, fig. 1 (pls. in vol. 40).

Niagaran (Brownsport): Decatur County, Tennessee.

CHICAGOCRINUS Weller.

Genotype: *C. ornatus* Weller.

Chicagocrinus Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 126, fig. 48.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 193.

Chicagocrinus inornatus Weller.

Chicagocrinus inornatus Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 128, pl. 7, figs. 10-12.

Niagaran (Racine): Joliet, Illinois.

Chicagocrinus ornatus Weller.

Chicagocrinus ornatus Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 127, pl. 7, fig. 9.

Niagaran (Racine): Bridgeport, Illinois.

CHEILOPORELLA Ulrich.

Genotype: *Fistulipora flabellata* Ulrich.

Cheiloporella Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 157.

Chiloporella Miller, N. A. Geol. Pal., 1889, p. 297.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 381.—Simpson, 14th Ann. Rep. State Geologist New York for 1894, 1897, p. 565.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 23.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 742.

Chiloporella flabellata (Ulrich).

Fistulipora flabellata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 28, pl. 7, figs. 26, 26b.

Chiloporella flabellata Ulrich, Geol. Surv. Illinois, 8, 1890, p. 381, pl. 39, figs. 5, 5b.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 802, pl. 11, figs. 1, 1a; pl. 12, figs. 1, 1b.

Chiloporella nicholsoni (not *Ceramopora nicholsoni* James) Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 207.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

Holotype and *pleiotype*.—Cat. No. 44110, U.S.N.M.

CHEILOPORELLA NICHOLSONI Nickles and Bassler. See *Chiloporella flabellata*.

CHILOTRYPA Ulrich.Genotype: *Chilotrypa hispida* Ulrich.*Cheilotrypa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1884, 7, p. 49.

Chilotrypa Miller, N. A. Geol. Pal., 1889, p. 297.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 382; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 269.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 554.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 26.—Grabau, Bull. New York State Mus., 45, 1901, p. 163; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 163.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 24.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 125.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 330.—Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 267.

Chilotrypa circe (Billings).*Helopora* Circe Billings, Cat. Sil. Foss. Anticosti, 1886, p. 39.

Anticostian (Jupiter River): Two miles east of Jupiter River, etc., Anticosti.

CHILOTRYPA? COALESCENS Nickles and Bassler. See *Chilotrypa ostiolata*.**Chilotrypa micropora** Ulrich and Bassler.*Chilotrypa micropora* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 268, pl. 41, figs. 9-12.

Helderbergian (Keyser): Keyser, West Virginia.

Cotypes.—Cat. No. 53657, U.S.N.M.**Chilotrypa ostiolata** (Hall).*Trematopora ostiolata* Hall, Pal. New York, 2, 1852, p. 152, pl. 40A, figs. 5a-m.—Nicholson, Pal. Prov. Ontario, 1875, p. 60, fig. 26.*Cheilotrypa ostiolata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, pl. 3, figs. 7, 7a.

Chilotrypa ostiolata Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, pl. 21, figs. 1, 2.—Grabau, Bull. New York State Mus., 45, 1901, p. 164, fig. 60; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 164, fig. 60.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 24, 25, pl. 8, figs. 11-15; pl. 9, figs. 1-4.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 125, figs. 184a-b.

Trematopora coalescens Hall, Pal. New York, 2, 1852, p. 150, pl. 40A, figs. 2a, b. *Chilotrypa?* *coalescens* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 207.

Clinton: Lockport, etc., New York; Ontario (Rochester); Osgood, Indiana (Osgood).

Plesiotypes.—Cat. Nos. 43278, 44117, U.S.N.M.**Chilotrypa varia** (Hall).

Trematopora varia Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 10, figs. 15-23; mus. ed., 1879, p. 111, pl. 10, figs. 15-23; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 232, pl. 9, figs. 15-23.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1202, figs.

Diamesopora varia Ulrich, Geol. Surv. Illinois, 8, 1890, p. 467.*Chilotrypa varia* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 208. Niagaran (Waldron): Waldron, Indiana.**Chilotrypa variolata** (Hall).

Trematopora variolata Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 11, figs. 9, 10; mus. ed., 1879, p. 113, pl. 9, figs. 9, 10; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 234, pl. 10, figs. 9, 10.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1203, figs.

Chilotrypa variolata Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 208. Niagaran (Waldron): Waldron, Indiana.

CHIROCRINUS Jaekel. See *Cheirocrinus* Eichwald.

CHIROCRINUS LOGANI Jaekel. See *Glyptocystites logani*.

CHIROSPONGIA Miller. See *Pattersonia* Miller.

CHIROSPONGIA FABERI Miller. See *Leptopoterion mammiferum*.

CHIROSPONGIA WENTI Miller. See *Pattersonia aurita*.

CHITON CANADENSIS Billings. See *Priscochiton canadensis*.

Chloephyicus Miller and Dyer. Genotype: *C. plumosum* Miller and Dyer.

Chloephyicus Miller and Dyer, Contr. to Pal., No. 2, 1878, p. 3.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 130.

Observation.—Abandoned by Miller as probably inorganic.

Chloephyicus filiciforme (James).

Buthotrephis filicormis James, Paleontologist, No. 2, 1878, p. 9; Jour. Cincinnati Soc. Nat. Hist., 14, 1891, p. 46.

Chloephyicus filiformis James, *ibid.*, 7, 1885, p. 159.

Maysville: Lebanon, Ohio.

Chloephyicus plumosum Miller and Dyer.

Chloephyicus plumosum Miller and Dyer, Contr. to Pal., No. 2, 1878, p. 3, pl. 4, fig. 1.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 130, pl. 6, fig. 3; *ibid.*, 14, 1891, p. 46.

Eden: Cincinnati, Ohio.

CHONDRITES Sternberg. Genotype: *Fucoides targionii* Brongniart.

Chondrites Sternberg, Flora Vorwelt, 2 (Versuch), pt. 5, 6, 1833, p. 25.—Nathorst, Kongl. Sven. Vet.-Akad. Handl., 21, No. 14, 1886, p. 34.—Miller, N. A. Geol.

Pal., 1889, p. 114.—Rauff, Neues Jahrb. f. Min. Geol. Pal., 2, 1891, p. 101.

Chondrites (Buthotrephis) cuneatus Whiteaves.

Chondrites (Bythotrephis) cuneatus Whiteaves, Pal. Foss. Geol. Surv. Canada, 3, pt. 3, p. 140, fig. 8.

Black River or Richmond: Cat Head, Lake Winnipeg, Canada.

Chondrites cupressinus Whiteaves.

Chondrites cupressinus Whiteaves, Canadian Rec. Sci., 6, 1896, p. 388; Pal. Foss. Geol. Surv. Canada, 3, pt. 3, 1897, p. 141, pl. 17, fig. 1.

Black River or Richmond: Cat Head, Lake Winnipeg, Canada.

Chondrites gracillimus Whiteaves.

Chondrites gracillimus Whiteaves, Canadian Rec. Sci., 6, 1896, p. 389; Pal. Foss., Geol. Surv. Canada, 3, pt. 3, p. 141, pl. 17, fig. 2.

Black River or Richmond: Inmost Island, Kinnow Bay, Lake Winnipeg.

Chondrites metissicus Dawson.

Chondrites Metissicus Dawson, Trans. Royal. Soc. Canada, 2d ser., 1, sec. 4, 1896, p. 121.

Canadian? (Levis?): Metis, Quebec.

Chondrites (Buthotrephis) patulus Whiteaves.

Chondrites patulus Whiteaves, Canadian Rec. Sci., 6, 1896, p. 387.

Chondrites (Bythotrephis) patulus Whiteaves, Pal. Foss. Geol. Surv. Canada, 3, pt. 3, 1897, pp. 137, 138, figs. 5, 6, 7.

Black River or Richmond: Inmost and Birch Islands, Kinnow Bay, Lake Winnipeg, Canada

CHONETES Fischer de Waldheim.Genotype: *Orthis striatella* Dalman.

Chonetes Fischer de Waldheim, *Oryct. Gouv. Moscow*, pt. 2, 1837, pp. 134, 193, pl. 26, figs. 8, 9.—Hall, *Pal. New York*, 2, 1852, p. 64.—Billings, *Canadian Jour.*, 6, 1861, p. 349.—Meek and Hayden, *Pal. Upper Missouri*, Smithsonian Cont. Knowl., 172, 1864, p. 22.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 242; *Pal. New York*, 4, 1867, p. 115.—Walcott, *Mon. U. S. Geol. Surv.*, 8, 1884, p. 122.—Nettelroth, *Kentucky Fossil Shells*, Mem. Kentucky Geol. Surv., 1886, p. 66.—Miller, *N. A. Geol. Pal.*, 1889, p. 339.—Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, p. 303; 11th Ann. Rep. New York State Geol., 1894, p. 292.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 232, text fig. 192, 4, 7.—Schuchert, *Bull. U. S. Geol. Surv.*, 87, 1897, p. 84.—Grabau, *Bull. Buffalo Soc. Nat. Sci.*, 6, 1899, p. 200.—Schuchert, *Zittel-Eastman Textb. Pal.*, 1, 1900, p. 316.—Beede, *Univ. Geol. Surv. Kansas*, 6, 1900, p. 67.—Grabau, *Bull. New York State Mus.*, 45, 1901, p. 185; *Bull. Buffalo Soc. Nat. Sci.*, 7, 1901, p. 185.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 233.—Schuchert, *Zittel-Eastman Textb. Pal.*, 1913, p. 389.

Chonetes bastini Williams.

Chonetes bastini Williams, *Proc. U. S. Nat. Mus.*, 45, 1913, p. 337, pl. 30, figs. 6, 7, 10.

Silurian (Pembroke): Leighton Cove, etc., Washington County, Maine.

Cotypes.—Cat. No. 58960, 58961, U.S.N.M.

Chonetes cobscookii Williams.

Chonetes cobscookii Williams, *Proc. U. S. Nat. Mus.*, 45, 1913, p. 327, pl. 29, fig. 5.

Silurian (Edmunds): South of Field Point, west shore of Cobscook River, Washington County, Maine.

Holotype.—Cat. No. 58949, U.S.N.M.

Chonetes colliculus Foerste.

Chonetes colliculus Foerste, *Jour. Cincinnati Soc. Nat. Hist.*, 21, 1909, p. 24, pl. 1, figs. 10A, B, C.

Cayugan (Kokomo): Kokomo, Indiana.

Chonetes cornutus (Hall).

Strophomena cornuta Hall, *Geol. New York*, Rep. 4th Dist., 1843, p. 73, fig. 3.

Chonetes cornuta Dekoninck, *Recher. Animaux Foss.*, pt. 1, 1847, p. 200, pl. 20, fig. 3.—Hall, *Pal. New York*, 2, 1852, p. 64, pl. 21, fig. 10; 2d Ann. Rep. New York State Geol., 1883, pl. 47, fig. 1.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1889, p. 125, figs.—Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, pl. 16, fig. 1.—Grabau, *Bull. New York State Mus.*, 45, 1901, p. 185, fig. 93; *Bull. Buffalo Soc. Nat. Sci.*, 7, 1901, p. 185, fig. 93.

Chonetes cf. *cornutus* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 432, pl. 2, fig. 12.

Upper Clinton: Wayne County, New York; Pennsylvania; Maryland.

Chonetes edmundsi Williams.

Chonetes edmundsi Williams, *Proc. U. S. Nat. Mus.*, 45, 1913, p. 323, pl. 29, figs. 6-9.

Silurian (Edmunds): Edmunds Township, Washington County, Maine.

Cotypes.—Cat. No. 58945, U.S.N.M.

Chonetes jerseyensis Weller.

Chonetes jerseyensis Weller, *Ann. Rep. Geol. New Jersey*, 1900, p. 8; *Geol. Surv. New Jersey*, *Pal.*, 3, 1903, p. 230, pl. 20, figs. 11-16.—Maynard, *Maryland Geol. Surv.*, Low. Dev., 1913, p. 338, pl. 61, figs. 17-19.

Chonetes jerseyensis—Continued.

Helderbergian: Two miles south of Tristates, New York (Decker Ferry); Dawson, Cash Valley, Tonoloway, etc., Maryland; Keyser, West Virginia (Keyser).
Cayugan (Cobleskill): Schoharie and Litchfield, New York.

Chonetes jerseyensis spinosus Maynard.

Chonetes jerseyensis var. *spinosus* Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 339, pl. 61, fig. 20.
Helderbergian (Keyser): Hancock, Maryland.

CHONETES MINIMA Hall (not Sowerby). See *Chonetes undulatus*.

CHONETES NOVASCOTICA Hall, 1879. See *Chonetes novascotica waldronensis*.

Chonetes novascoticus Hall.

Chonetes novascotica Hall, Canadian Nat. Geol., 5, 1860, p. 144, fig. 2.—Dawson, Acadian Geol., Suppl. Chap., 1860, p. 68, fig. 48; Acadian Geol., 3d ed., 1878, p. 595, fig. 199.

Chonetes cfr. *nova-scotia* Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Engl. ed., p. 12, pl. 1, fig. 25.—Katzer, Grundz. d. Geol. d. unt. Amazonas, Leipzig, 1903, pl. 16, fig. 8.

Silurian (Moynet, Stonehouse): Arisaig, Nova Scotia.

Chonetes novascoticus waldronensis Foerste.

Chonetes novascotica waldronensis Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 328.

Chonetes novascotica Hall, 28th Rep. New York State Mus. Nat. Hist., 1879, p. 155, pl. 22, figs. 11-14; 11th Rep. Indiana Geol. Nat. Hist., 1882, p. 293, pl. 22, figs. 11-14.

Niagaran (Waldron): Waldron, Indiana.

Chonetes (Eodevonaria) primigenius Twenhofel.

Chonetes (Eodevonaria) primigenius Twenhofel, Bull. Victoria Mem. Mus., 3, 1914, p. 26, pl. 1, figs. 4, 5.

Richmond (Charleton), Gamachian, and Anticostian: Ellis Bay, Jumpers, etc. Anticosti.

Chonetes striatellus (Dalman).

Orthis striatella Dalman, Kgl. Svens. Vet.-Akad. Handl., 1828, p. 111, pl. 1, fig. 5.
Chonetes striatella Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 595.—

Koninck, Animaux Fossiles, pt. 1, 1847, p. 200, pl. 20, figs. 5a-g.—Davidson, Mon. Brit. Sil. Brachiopoda, Pal. Soc., 1871, p. 331, pl. 49, figs. 23-26.

Chonetes conf. *striatella* Emerson, Narrative Hall's Sec. Arctic Exped., U. S. Navy Dept., p. 578.

Silurian: Europe; Cape Louis Napoleon, Arctic America.

Chonetes tenuistriatus Hall.

Chonetes tenuistriata Hall, Canadian Nat. Geol., 5, 1860, p. 145, fig. 3.—Dawson, Acadian Geol., 3d ed., 1878, p. 596, fig. 200.

Silurian (Ross Brook and McAdam): East River, Nova Scotia.

Chonetes undulatus Hall.

Chonetes minima Hall (not Sowerby), 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1876, pl. 22, fig. 15.

Chonetes undulata Hall, *ibid.*, 1879, p. 155, pl. 22, fig. 15; 11th Rep. State Geol. Indiana, 1882, p. 294, pl. 22, fig. 15.

Niagaran (Waldron): Waldron, Indiana.

Chonetes vetustus Foerste.

Chonetes vetusta Foerste, Bull. Geol. Surv. Kentucky, 7, 1906, p. 327; Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 24, pl. 1, fig. 16.

- Clinton (Alger): Lewis County, Kentucky.

CHONOPHYLLUM Edwards and Haime.

Genotype: *Cyathophyllum perfoliatum* Goldfuss.

Chonophyllum Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, pp. 169, 405.—Pictet, Traite Pal., 2d ed., 4, 1857, p. 457.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 398.—Lindstrom, Geol. Mag., 3, 1866, pp. 360, 411.—Hall and Whitfield, 23d Rep. New York State Cab. Nat. Hist., 1873, p. 233, footnote.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 115.—Zittel, Handb. Pal., 1, 1879, p. 229.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 360.—Miller, N. A. Geol. Pal., 1889, p. 177.—Sherzer, Amer. Geol., 6, 1890, p. 61; 8, 1890, pp. 278–283; Bull. Geol. Soc. Amer., 3, 1892, p. 256, 258.—Nicholson, Rec. Geol. New South Wales, 4, 1894, p. 15.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 185.—Grabau, Bull. New York State Mus., 45, 1901, p. 139, fig. 32; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 139.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 2, 1902, p. 109.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 62. *Craterophyllum* (new subg. of *Chonophyllum*) Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 102.

Chonophyllum belli Billings.

Chonophyllum belli Billings, Canadian Nat. Geol., n. s., 2, 1865, p. 432.—Sherzer, Amer. Geol., 6, 1890, p. 61; Bull. Geol. Soc. Amer., 3, 1892, p. 268.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 186, pl. 16, figs. 5–6.

Upper Medinan (Cataract?): Manitoulin Island, Lake Huron.

Chonophyllum (Craterophyllum) canadense (Billings).

Ptychophyllum Canadense Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 107 (adv. sheets, 1862); Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 34 (loc. ref.).

Chonophyllum Canadense Lambe, Ottawa Naturalist, 12, 1899, p. 222; Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 185, pl. 17, figs. 1–4.

Chonophyllum (Craterophyllum) canadense Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 102 (gen. ref.).

Anticostian (Jupiter River, Chicotte): Southwest Point, Anticosti.

Chonophyllum? capax Hall.

Chonophyllum capax Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 410 (ext. 1882, p. 6).—Sherzer, Amer. Geol., 6, 1890, p. 61; Bull. Geol. Soc. Amer., 3, 1892, p. 273.

Niagaran (Louisville): Louisville, Kentucky.

Chonophyllum greenei Sherzer.

Chonophyllum greenei Sherzer, Bull. Geol. Soc. Amer., 3, 1892, p. 275, pl. 8, fig. 7.

Niagaran (Louisville): Louisville, Kentucky.

CHONOPHYLLUM NIAGARENSE Hall. See *Cystiphyllum niagarense*.

Chonophyllum nymphae (Billings).

Cyathophyllum nymphae Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 111 (adv. sheets, 1862).

Chonophyllum nymphae Lambe, Ottawa Naturalist, 12, 1899, p. 251; Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 187, pl. 18, figs. 1, 1a.

Silurian: Anse a la Vieille, Bay of Chaleurs, Quebec.

Chonophyllum solitarium Foerste.

Chonophyllum solitarium Foerste, Bull. Geol. Surv. Kentucky, 7, 1906, p. 317, pl. 7, fig. 2.

Clinton (Waco): North of Estill Springs, Kentucky.

Chonophyllum vadium Hall.

Chonophyllum vadium Hall, 12th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 272, pl. 15, figs. 1-4; 35th Rep. New York State Mus. Nat. Hist., 1884, p. 410 (ext. 1882, p. 6).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 130, figs.—Sherzer, Amer. Geol., 6, 1890, p. 61; Bull. Geol. Soc. Amer., 3, 1892, p. 273.

Niagaran (Louisville): Louisville, Kentucky.

Chonophyllum (Craterophyllum) vulcanius Foerste.

Chonophyllum (Craterophyllum) vulcanius Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 101, pl. 1, fig. 12.

Niagaran (Brownsport): West of Hope Creek, Perry County, Tennessee.

CHRISTIANIA Hall and Clarke.

Genotype: *Leptaena subquadrata* Hall.

Christiania Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 298.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 687.—Hall, 11th Ann., Rep. New York State Geol., 1894, p. 290.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 314; 2d ed., 1913, p. 314.

Christiania subquadrata Hall.

Leptaena subquadrata Hall, 2d Ann. Rep. New York State Geol., 1883, pl. 46, figs. 32, 33.

Christiania subquadrata Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 298, 351, pl. 15, figs. 32, 33; pl. 15A, fig. 36; pl. 20, figs. 18-20; 48th Rep. New York State Mus., 2, 1895, p. 351, pl. 6, figs. 13-18; 14th Rep. State Geol. New York for 1894, 1897, p. 351, pl. 6, figs. 13-18.

Chazy (Ottoese): Blount County, Tennessee.

Christiania trentonensis Ruedemann.

Christiania trentonensis Ruedemann, Bull. New York State Mus., 49, 1901, p. 21, pl. 2, figs. 2-6.—Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, pl. 3, figs. 14-16.

Mohawkian: Rysedorph Hill, Rensselaer County, New York (Rysedorph); Pennsylvania, Maryland, and Virginia (Chambersburg).

Cladograpsus Emmons.

Genotype: *C. dissimilaris* Emmons.

Cladograpsus Emmons, Amer. Geology, 1, pt. 2, 1855, p. 107.

Cladograpsus dissimilaris Emmons.

Cladograpsus dissimilaris Emmons, Amer. Geology, 1, pt. 2, 1855, p. 107, pl. 1, fig. 15.

"Taconic": Locality not given.

Observation.—Figures and description not sufficient for recognition.

CLADOGRAPSUS GRACILIS Carruthers. See *Nemagraptus gracilis*.**Cladograpsus inaequalis** Emmons.

Cladograpsus inaequalis Emmons, Amer. Geology, 1, pt. 2, 1855, p. 107.

Dicranograptus? inaequalis Gurley, Jour. Geology, 4, 1896, p. 96 (gen. ref.).

"Taconic": Parrottsville, Tennessee.

Observation.—Probably a species of *Dicranograptus*, but description is not sufficient for determination.

CLADOGRAPSUS LINEARIS Carruthers. See *Pleurograptus linearis*.

CLADOGRAPSUS RAMOSUS Geinitz. See *Dicranograptus ramosus*.

CLADOPORA Hall.

Genotype: *C. seriata* Hall.

Cladopora Hall, Amer. Jour. Sci. Arts, 2d ser., 11, 1851, p. 400; Pal. New York, 2, 1852, p. 137; Rep. Geol. Surv. Iowa, 1, pt. 2, 1858, p. 478.—Rominger, Amer. Jour. Sci. and Arts, 2d ser., 34, 1862, p. 390.—Hall and Whitfield, 23d Rep. New York State Cab. Nat. Hist. (extract, 1872, p. 11), 1873, p. 229.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 46.—Zittel, Handb. Pal., 1, 1880, p. 618.—Miller, N. A. Geol. Pal. 1889, p. 178.—Sardeson, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 10, 1896, p. 319.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 29.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 146; Bull. New York State Mus., 45, 1901, p. 146.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 2, 1902, p. 253.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 92.

Cladopora aculeata Davis.

Cladopora aculeata Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 48, fig. 1; pl. 49, fig. 2.

Niagaran (Louisville): Near Louisville, Kentucky.

CLADOPORA AEDILIS Eichwald. See *Eridotrypa aedilis*.

Cladopora bifurcata Grabau.

Cladopora bifurcata Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 115, pl. 10, figs. 2-4; pl. 12, figs. 7, 8; pl. 15, fig. 1.

Upper Monroan: Amherstburg, Ontario (Anderdon); Wayne County, Michigan (Amherstburg).

Cladopora caespitosa Hall.

Cladopora caespitosa Hall, Pal. New York, 2, 1852, p. 138, pl. 38, figs. 2a-c.

Niagaran (Lockport): Lockport, New York.

Cladopora cervicornis Hall.

Cladopora cervicornis Hall, Pal. New York, 2, 1852, p. 139, pl. 38, figs. 3a, b.

Cladopora cf. *cervicornis* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 116, pl. 14, fig. 5.

Niagaran (Lockport): Lockport, New York.

?Upper Monroan (Amherstburg): Amherstburg, Ontario.

Cladopora complanata Davis.

Cladopora complanata Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 49, fig. 1.

Niagaran: Near Louisville, Kentucky (Louisville); near Linden, Tennessee (Brownport).

CLADOPORA CRASSA Lambe. See *Cenites crassa*.

Cladopora equisetalis Davis.

Cladopora equisetalis Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 48, fig. 7.

Niagaran (Louisville): Louisville, Kentucky.

Holotype.—Cat. No. 52642, U.S.N.M.

Cladopora fibrosa Hall.

Cladopora fibrosa Hall, Pal. New York, 2, 1852, p. 139, pl. 38, figs. 4a, b, and 5a, b.

Niagaran (Lockport-Gasport member): Lockport, New York.

Cladopora laqueata Rominger.

Cladopora laqueata Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 46, pl. 18, fig. 3.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 48, figs. 8, 9.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 131, fig.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 92.

Niagaran: Near Seul Choix, Michigan; Louisville, Kentucky (Louisville).

Plesiotypes.—Cat. No. 52641, U.S.N.M.

Cladopora lichenoides Winchell and Marcy.

Cladopora lichenoides Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 84, pl. 2, fig. 1.

Niagaran (Racine): Chicago, Illinois.

Cladopora macrophora Hall.

Cladopora macrophora Hall, Pal. New York, 2, 1852, p. 140, pl. 39, figs. 2a, b.

Niagaran (Lockport): Lockport, New York.

Cladopora menis Davis.

Cladopora menis Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 48, figs. 4, 5.

Niagaran (Louisville): Near Louisville, Kentucky.

Cladopora multipora Hall.

Cladopora multipora Hall, Pal. New York, 2, 1852, p. 140, pl. 39, figs. 1a-g.—Lambe, Cont. Can. Pal. Geol. Surv. Canada, 4, pt. 1, 1899, p. 29.—Grabau, Bull. New York State Mus., 45, 1901, p. 147, fig. 44; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 147, fig. 44.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 33.

Favosites multipora Nicholson, Canadian Jour., n. s., 14, 1873, p. 40.—Nicholson and Hinde, *ibid.*, 14, 1874, p. 148.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 53.

Favosites Halliana Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 148.

Niagaran: Lockport and Shelby, New York (Lockport-Guelph); Lake Temiscaming, Quebec.

Cladopora multiseriata Weller.

Cladopora multiseriata Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 271, pl. 26, figs. 2, 3.—Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 217.

Helderbergian: Near Hainesville, New Jersey (Coeymans); near Cumberland, Maryland (Keyser).

Cladopora ordinata Davis.

Cladopora ordinata Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 48, fig. 2.

Niagaran (Louisville): Near Louisville, Kentucky.

Cladopora proboscidalis Davis.

Cladopora proboscidalis Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 48, fig. 3; pl. 97, fig. 21.

Niagaran (Louisville): Near Louisville, Kentucky.

Cladopora rectilineata Simpson.

Cladopora rectilineata Simpson, Trans. Amer. Phil. Soc., n. s., 16, 1889, p. 459, fig. 30.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 221, pl. 17, figs. 14-17.—Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 216, pl. 25, figs. 4-7.—Holtedahl, 2d Arct. Exp. "Fram," 1898-1902, No. 32, 1914, p. 14, pl. 4, fig. 7.

Cladopora rectilineata—Continued.

Helderbergian: Near Tristates, New York (Decker Ferry); Keyser, West Virginia; near Cumberland, Pinto, etc., Maryland (Keyser); southwestern Ellesmereland, Arctic America.

Cladopora reticulata Hall.

Cladopora reticulata Hall, Pal. New York, 2, 1852, p. 141, pl. 39, figs. 3a-e.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 85.—White, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 384, pl. 47, fig. 6.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 47, figs. 1, 2.—Miller, N. A. Geol. Pal., 1889, p. 178, fig. 152.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, p. 132, fig.

Omniretepora anastomosa D'Orbigny, Prodr. Pal., 1847, p. 45 (not defined).—Boule and Thevenin, Ann. Pal., 1, 1906, p. 7, pl. 3, figs. 3-5.

Niagaran: Louisville, Kentucky (Louisville); West Tennessee (Brownsport); Wisconsin; Lockport, New York.

Plesiotype.—Cat. No. 52640, U.S.N.M.

Cladopora sarmentosa Hall.

Cladopora sarmentosa Hall, Trans. Albany Inst., 10, 1883, p. 59.

Niagaran (Waldron): Waldron, Indiana.

Cladopora seriata Hall.

Cladopora seriata Hall, Pal. New York, 2, 1852, p. 137, pl. 38, figs. 1a-m.—Grabau, Bull. New York State Mus., 45, 1901, p. 146, fig. 43; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 146, fig. 43.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 93, fig. 148.

Favosites? *seriata* Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 149.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 54.

Niagaran (Rochester, Lockport): Lockport, etc., New York; Ontario.

Cladopora striata Davis.

Cladopora striata Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 48, fig. 6.

Niagaran (Louisville): Near Louisville, Kentucky.

Holotype: Cat. No. 51643, U.S.N.M.

CLADOPORA VERTICILLATA Winchell and Marcy. See *Coenites verticillata*.

CLARKELLA Walcott.

Genotype: *Polytoechia? montanensis* Walcott.

Clarkella Walcott, Smiths. Misc. Coll., 53, 1908, pp. 110-111, 142, 148, pl. 11; Mon. U. S. Geol. Surv., 51, 1912, p. 809.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 392.

Clarkella montanensis Walcott.

Polytoechia? montanensis Walcott, Proc. U. S. Nat. Mus., 28, 1905, p. 295.

Clarkella montanensis Walcott, Mon. U. S. Geol. Surv., 51, 1912, p. 810, pl. 104, figs. 2, 2a-d.

Canadian: East side of West Gallatin River, above Gallatin, Montana.

Holotype and paratypes.—Cat. No. 11857, U.S.N.M.

CLARKOCERAS Ruedemann.

Genotype: *Piloceras newton winchelli* Clarke.

Clarkoceras Ruedemann, Bull. New York State Mus., 80, 1905, p. 337.

Clarkoceras newton winchelli (Clarke).

Piloceras newton-winchelli Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 767, figs. 8, 9; pl. 47, figs. 1-3.

Clarkoceras newton winchelli—Continued.

Piloceras winchelli Miller, N. A. Geol. Pal., 2d App., 1897, p. 776.

Clarkoceras newton-winchelli Ruedemann, Bull. New York State Mus., 80, 1905, pp. 336, 337, figs. 25, 26.

Canadian (Shakopee): Union township, Houston County, Minnesota.

CLATHRODICTYON Nicholson and Murie.

Genotype: *C. vesiculosum* Nicholson and Murie.

Clathrodictyon Nicholson and Murie, Jour. Linn. Soc. Zool., 14, 1878, p. 216, 220; Mon. Sil. Foss. Girvan Dist., 1880, p. 237.—Zittel, Handb. Pal., 1, 1879, p. 286.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 535.—Nicholson, Mon. Brit. Strom., Pal. Soc., 1886, pp. 16, 77; Ann. Mag. Nat. Hist., 5th ser. 19, 1897, p. 2, footnote.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 149; Zittel-Eastman Textb. Pal., 1, 1900, p. 112.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 40.—Parks, Univ. Toronto Studies, Geol. Ser., No. 4, 1907, p. 12; No. 5, 1908, p. 14; No. 6, 1909, pp. 7, 28; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 123.

Clathrodictyon cystosum Parks.

Stromatopora vesiculosa Rominger (not Nicholson and Murie), Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 50.

Clathrodictyon cystosum Parks (*Stromatopora cystosum* Rominger MS.), Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 21, pl. 7, figs. 3, 4; pl. 8, figs. 6, 8; No. 6, 1909, p. 29.

Niagaran: Drummond Island; Iowa; Drift at Ann Arbor, Michigan; ?Kentucky; Bessels Bay, Greenland.

Cotypes.—Cat. Nos. 36924, 54296, U.S.N.M.

Clathrodictyon cystosum cylindricum Parks.

Clathrodictyon cystosum var. *cylindricum* Parks, Univ. Toronto Studies, Geol. Ser., No. 6, 1909, p. 29.

Niagaran: Southampton Island, Hudson Bay, Canada.

Clathrodictyon cystosum lineatum Parks.

Clathrodictyon cystosum var. *lineatum* Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 24, pl. 8, fig. 8; No. 6, 1909, p. 29, pl. 20, fig. 9.

Niagaran: Drift at Ann Arbor, Michigan; Beechy Island, Lancaster Sound, Canada. *Holotype*.—Cat. No. 54238, U.S.N.M.

Clathrodictyon drummondense Parks.

Clathrodictyon drummondense Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 26, pl. 7, fig. 7; pl. 8, figs. 3, 7; No. 6, 1909, p. 30, pl. 20, figs. 7, 8.

Niagaran: Drummond Island; Louisville, Kentucky; Rainy Island, Attawapiskat River, and Southampton Island, Hudson Bay, Canada.

Holotype and *paratype*.—Cat. Nos. 36814, 54237, U.S.N.M.

Clathrodictyon fastigiatum Nicholson.

Clathrodictyon fastigiatum Nicholson, Mon. British Strom., pt. 2, 1886, p. 43, fig. 3; 1888, p. 152, pl. 19, figs. 1-5; Ann. Nat. Hist., 5th ser., 19, 1897, p. 8, pl. 2, figs. 3, 4.—Whiteaves, Pal. Foss., 3, pt. 2, 1895, p. 52; Canadian Rec. Sci., 7, p. 135; Pal. Foss., 3, pt. 4, 1906, p. 328.—Parks, Univ. Toronto Studies, Geol. Ser., No. 4, 1907, p. 18, pl. 1, fig. 6; No. 5, 1908, p. 24, pl. 7, fig. 8; cf. pl. 7, fig. 4, pl. 8, fig. 6.

Niagaran: Glenelg Township, Elora and Aboyne, Ontario (Guelph); Drummond and Manitoulin Islands, Lake Huron; Drift, Ann Arbor, Michigan.

Plesiotype.—Cat. No. 54239, U.S.N.M.

CLATHRODICTYON FRANKLINENSE Ami. See *Actinostroma franklinense*.

Clathrodictyon ostiolatum (Nicholson).

Stromatopora ostiolata Nicholson, Ann. Mag. Nat. Hist., 4th ser., 12, 1873, p. 90, pl. 4, fig. 1a; Pal. Prov. Ontario, 1874, pl. 1, fig. 1, 1a; pt. 2, 1875, p. 63.—Nicholson and Murie, Jour. Linn. Soc. London, Zool., 14, 1878, p. 219, pl. 2, figs. 1, 2.—Nicholson, Ann. Mag. Nat. Hist., 4th ser., 12, 1890, pl. 5, fig. 1a.

Clathrodictyon (Stromatopora) ostiolatum Nicholson, Mon. British Strom., pt. 1, 1886, p. 14.

Clathrodictyon ostiolatum Nicholson, Ann. Mag. Nat. Hist., 5th ser., 19, 1887, p. 11, pl. 3, figs. 1-3.—Whiteaves, Pal. Foss., 3, pt. 2, 1895, p. 52; Can. Rec. Sci., 7, 1896, p. 135.—Ruedemann, Mem. New York State Mus., 5, 1903, p. 37, pl. 1, figs. 10-12.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 41.—Whiteaves, Pal. Foss., 3, pt. 4, 1906, p. 328.—Parks, Univ. Toronto Studies, Geol. Ser., No. 4, 1907, p. 12, pl. 2, figs. 1-2; pl. 5, figs. 7, 8; No. 5, 1908, p. 26.—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 87, pl. 8, fig. 6; pl. 13, fig. 1; pl. 16, fig. 18.

Niagaran: Ontario and Shelby and Rochester, New York (Guelph); Owen Sound and Manitoulin Island.

Upper Monroan (Anderdon): Detroit River, Canada.

Clathrodictyon rectum Parks.

Clathrodictyon rectum Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1906, p. 28, pl. 14, figs. 5, 7.

Niagaran (Louisville): Louisville, Kentucky.

Clathrodictyon striatellum (D'Orbigny).

Stromatopora concentrica Lonsdale, Sil. Syst., 1839, p. 680, pl. 15, fig. 31.

Stromatopora striatella D'Orbigny, Prod. Pal., 1, 1850, p. 51.—Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 145.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 49.—Roemer, Leth. Geog., pt. 1, Leth. Pal., 1883, p. 540.—Whiteaves, Canadian Rec. Sci., 7, 1896, p. 144.

Stromatopora mammillata Schmidt, Sil. Form von Esthland, 1858, p. 232.—Von Rosen, Ueber die Natur. der Strom., 1867, p. 71, pl. 8, figs. 1-5.—Roemer, Leth. Geog., pt. 1, Leth. Pal., 1, 1883, p. 531, fig. 125.

Cœnostoma botryoideum Spencer, Bull. Mus. Univ. State Missouri, 1, 1884, p. 59, pl. 6, figs. 13-13b; Trans. Acad. Sci. St. Louis, 4, 1884, p. 600, pl. 6, figs. 13-13b.

Clathrodictyon striatellum Nicholson, Ann. Mag. Nat. Hist., 5th ser., 19, 1887, p. 6, pl. 1, figs. 9, 10; Mon. British Strom., 1886, p. 156, pl. 1, fig. 1, pl. 5, fig. 3; pl. 19, figs. 6-12.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 40, fig. 61b.—Parks, Univ. Toronto Studies, Geol. Ser., No. 4, 1907, p. 14, pl. 1, figs. 3, 4; pl. 6, fig. 8; No. 5, 1908, p. 25; No. 6, 1909, p. 28.

Silurian: England, Gotland, and Esthonia.

Niagaran: Guelph, Hamilton, Owen Sound, islands of Lake Huron, Southampton Island, Hudson Bay, etc., Canada.

Clathrodictyon variolare (Von Rosen).

Stromatopora variolaris Von Rosen, Ueber die Natur der Stromatoporen, 1867, p. 61, pl. 2, figs. 2-5.

Clathrodictyon variolare Nicholson, Ann. Mag. Nat. Hist., 5th ser., 7, 1887, p. 4, pl. 1, figs. 4-6; Mon. British Strom., 1892, p. 150, pl. 18, figs. 1-5, pl. 17, fig. 14.—Whiteaves, Canadian Rec. Sci., 7, 1897, p. 130.—Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 19, pl. 7, fig. 2, pl. 8, figs. 1, 9.—1, 9.—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 89, pl. 9, figs. 1, 2.

Clathrodictyon variolare—Continued.

Niagaran: Mann Island, Lake Temiscaming, Manitoulin Island, Drummond Island, and the north shore of Lake Michigan.

Upper Monroan (Anderdon): Near Amherstburg, Ontario.

Plesiotype.—Cat. No. 36825, U.S.N.M.

Clathrodictyon vesiculosum Nicholson and Murie.

Stromatopora striatella McCoy, British Pal. Foss., 1851, p. 12.

Clathrodictyon vesiculosum Nicholson, Ann. Mag. Nat. Hist., 5th ser., 19, 1877, p. 1, figs. 1-3.—Nicholson and Murie, Jour. Linn. Soc. Zool., 14, 1878, p. 220, pl. 2, figs. 11-13, p. 216.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan, 1880, p. 238, pl. 19, fig. 2.—Nicholson, Mon. British Strom., 1892, p. 147, pl. 17, figs. 10-13; pl. 18, fig. 12.—Whiteaves, Can. Rec. Sci., 7, 1896, p. 134.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 40, figs. 61a, 62, 63.—Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 14, pl. 7, figs. 1, 6; pl. 8, figs. 3-5; No. 6, 1909, p. 28.—Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 68, pl. 3, fig. 8.

Stromatopora concentrica Spencer, Bull. Mus. Univ. Missouri, 1, 1882, p. 45.

Silurian: England and Scotland; Ontario, Michigan, New York, Iowa, Ohio, Illinois, Missouri, and Anticosti.

Clathrodictyon vesiculosum astrodistsans Parks.

Clathrodictyon vesiculosum var. *astrodistsans* Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 19.

Niagaran: Drummond Island, Lake Huron.

Cotypes.—Cat. No. 36925, U.S.N.M.

Clathrodictyon vesiculosum minutum (Rominger).

Stromatopora minutum Rominger (part), Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 49.

Clathrodictyon vesiculosum var. *minutum* Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 19, pl. 7, fig. 6; pl. 8, fig. 5; No. 6, 1909, p. 29.

Niagaran: Lake Temiscaming and Southampton Island, Hudson Bay, Canada.

CLATHROGRAPTUS GEINITZIANUS Lapworth. See *Retiograptus geinitzianus*.

CLATHROPORA Hall.

Genotype: *Clathropora frondosa* Hall.

Clathropora Hall, Amer. Jour. Sci. Arts, 2d. ser., 11, 1851, p. 400; Pal., New York, 2, 1852, p. 159.—Pictet, Traite de Paleontologie, 2d ed., 4, 1857, p. 170.—Nicholson, Geol. Mag., dec. 2, 1, 1874, p. 124; Pal. Prov. Ontario, 1874, p. 111.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 152.—Vine, Rep. 51st Meeting Brit. Assoc. Adv. Sci., 1882, p. 166.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 39.—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1884, p. 153.—Miller, N. A. Geol. Pal., 1889, p. 297.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 392; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 279.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 543.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 45.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 173; Bull. New York State Mus., 45, 1901, p. 173.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 56.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 156.

Clathropora aldicornis Hall.

Clathropora aldicornis Hall, Pal. New York, 2, 1852, p. 159, pl. 40B, figs. 4a-c.—Grabau, Bull. New York State Mus., 45, 1901, p. 174, fig. 76; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 174, fig. 76.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 56, 57, pl. 20, figs. 1-4.

Clinton (Rochester): Lockport, New York.

Figured section of *holotype*.—Cat. No. 35552, U.S.N.M.

CLATHROPORA CLINTONENSIS Hall and Whitfield. See *Clathropora frondosa clintonensis*.

CLATHROPORA FLABELLATA Hall. See *Graptodictya proava*.

Clathropora frondosa Hall.

Clathropora frondosa Hall, Pal. New York, 2, 1852, p. 160, pl. 40B, figs. 5a-e.—Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 139.—Nicholson, Pal. Prov. Ontario, 1875, p. 59.—(Van Cleve) White, 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 385, pl. 55, fig. 3.—Miller, N. A. Geol. Pal., 1889, p. 297, fig. 467.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 133, fig.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, fig. 104 (p. 544).—Grabau, Bull. New York State Mus., 45, 1901, p. 174, fig. 75; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 173, fig. 75.—Bassler, Bull. U. S. Geol. Surv., 292, p. 56, pl. 20, figs. 5-11; pl. 21, figs. 6-7.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 11.

Clinton: Lockport, Clinton, etc., New York; Grimsby, etc., Ontario (Rochester); Lewis County, Kentucky (West Union).

Plesiotypes.—Cat. No. 44146, U.S.N.M.

CLATHROPORA FRONDOSA Foerste (part). See *Clathropora frondosa clintonensis*.

Clathropora frondosa clintonensis (Hall and Whitfield).

Clathropora clintonensis Hall and Whitfield, Pal. Ohio, 2, 1875, p. 113, pl. 5, fig. 7.—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 154; 3, 1888, pl. 15, fig. 4; Geol. Surv. Ohio, 7, 1895, p. 598, pl. 28, fig. 4.

Clathropora frondosa Foerste Bull. Sci. Lab. Denison Univ., 2, 1887, p. 154; 3, 1888, pl. 15, fig. 3; Geol. Surv. Ohio, 7, 1895, p. 598, pl. 28, fig. 3.

Clathropora frondosa-clintonensis Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 209.

Upper Medinan: Dayton and Fairhaven, Ohio; Kentucky; Tennessee (Brassfield); Dundas, etc., Ontario (Cataract).

Clathropora frondosa intermedia (Nicholson and Hinde).

Clathropora intermedia Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 140, fig. 5.—Nicholson, Pal. Prov. Ontario, 1875, p. 59, figs. 29a, b.

Clathropora frondosa intermedia Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 56, pl. 20, figs. 6-8.

Clinton (Rochester): Thorold and Hamilton, Ontario.

CLATHROPORA GLOMERATA Whitfield and Hovey. See *Stictopora? glomerata*.

Clathropora? gracilis Spencer.

Not recognizable.

Clathropora? gracilis Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 604, pl. 7, fig. 4; Bull. Mus. State Univ. Missouri, 1, 1884, p. 54, pl. 7, fig. 4.

Niagaran: Hamilton, Ontario.

CLATHROPORA INTERMEDIA Nicholson and Hinde. See *Clathropora frondosa intermedia*.

CLATHROSPIRA Ulrich and Scofield. Genotype: *Pleurotomaria subconica* Hall. *Pleurotomaria* (part) of numerous American and European authors.

Clathrospira Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pp. 954-1005.—Koken, Neues Jahrb. f. Min., Geol. Pal., 1, 1898, p. 19.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 948.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 644.

Clathrospira conica Ulrich and Scofield.

Clathrospira conica Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1008, pl. 70, figs. 1-4.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 165.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 644, figs. 878d-f.

Black River and Trenton: Minneapolis, Goodhue and Fillmore Counties, Minnesota; Kentucky; Baffin Land.

Maysville: Cincinnati, Ohio, and vicinity.

Cotypes.—Cat. Nos. 45744, 45746, U.S.N.M.

Clathrospira convexa Ulrich and Scofield.

Clathrospira convexa Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1007, pl. 69, fig. 51.

Black River (Platteville): Calhoun County, Illinois.

Holotype.—Cat. No. 45747, U.S.N.M.

Clathrospira delopeia (Billings).

Pleurotomaria Deiopeia Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 155.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 75, pl. 12, figs. 1, la.

Clathrospira Deiopeia (Ulrich) Whiteaves, Geol. Surv. Canada, Pal. Foss. 3, pt. 4, 1906, p. 332 (gen. ref.).

Niagaran (Guelph): Elora, Ontario.

Clathrospira subconica (Hall).

Pleurotomaria subconica Hall, Pal. New York, 1, 1847, p. 174, pl. 37, figs. 8a-e; p. 304, pl. 83, figs. 3a-e.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 160, pl. 17, fig. 9a, b.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 819, fig. 606.—Hall, Rep. Geol. Surv. Wisconsin, 1862, p. 39, fig. 1.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 180, fig. 174; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 17.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 317.—Whitfield, Geol. Wisconsin, 4, 1882, p. 216, pl. 6, fig. 1.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 157.—Whiteaves, Canadian Rec. Sci., 5, 1893, p. 319.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 716, figs.

Clathrospira subconica Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1006, pl. 69, figs. 47-50; pl. 70, figs. 5-6.—Ruedemann, Bull. New York State Mus., 49, 1901, p. 33.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 956, pl. 41, figs. 8, 8b.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 644, fig. 878a-c.

Black River—Richmond: Watertown, New York (Trenton); Canada; Ohio; Minnesota; Iowa; Tennessee; Anticosti; etc.

Plenotype.—Cat. Nos. 45748, 46051; U.S.N.M.

CLAVÆBLASTUS Hambach. See *Troostocrinus* Shumard.

CLEIDOPHORUS of authors. See *Clidophorus* Hall.

CLEIDOPHORUS MAJOR Ulrich. See *Lyrodesma major*.

CLEIOCRINUS Billings.

Genotype: *C. regius* Billings.

Cleioocrinus Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 276; Geol. Surv. Canada, dec. 4, 1859, p. 52, fig. 17.—Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 359.—Zittel, Handb. Pal., 1, 1879, p. 357.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 258 (Rev. Pal., pt. 1, p. 35, 147); *ibid.*, 1886, p. 76 (Rev. Pal., pt. 3, p. 152).—Miller, N. A. Geol. Pal., 1889, p. 231.—Bather, Treatise on Zool., pt. 3, Echinodermata, London, 1900, p. 191.—Springer, Amer. Geology, 30, 1902, p. 94; Mem. Mus. Comp. Zool. Harvard, 25, No. 2, 1905, p. 93.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 100.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 562.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 186.

CLEIOCRINUS—Continued.

Cleocrinus Hudson, Bull. New York State Mus., 149, 1911, p. 211.

Campanulites Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).—Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 356.—Miller, N. A. Geol. Pal., 1889, p. 230.—Bather, Treatise on Zool., 3, Echinoderma, 1900, p. 202 (Genotype *C. tessellatus* Troost.)

Cleocrinus billingsi Ford and Dwight.

Cleocrinus billingsi Ford and Dwight, Amer. Jour. Sci. Arts, 3d ser., 31, 1886, p. 252, pl. 7, fig. 5.

Middle Ordovician: Canaan, New York.

Observation.—Not recognized. Founded on fragment of a column.

Cleocrinus grandis Billings.

Cleocrinus grandis Billings, Geol. Surv. Canada, dec. 4, 1859, p. 54, pl. 5, figs. 2a-2c.—Meek, Amer. Jour. Sci. Arts, 3d ser., 2, 1871, p. 301.

Trenton: Ottawa, Ontario.

Observation.—Based on root end of column.

CLEIOCRINUS LAEVIS Springer. See *Cleocrinus tessellatus*.**CLEIOCRINUS LIBANUS** Safford. See *Cleocrinus tessellatus*.*Cleocrinus magnificus* Billings.

Cleocrinus magnificus Billings, Geol. Surv. Canada, dec. 4, 1859, p. 54, pl. 5, fig. 3.—Dwight, Proc. Poughkeepsie Acad. Nat. Sci., 1880, p. 19 (loc. occ.).—Springer, Mem. Mus. Comp. Zool., Harvard, 25, 1905, p. 111, pl. 1, figs. 11, 12.

Trenton: Ottawa, Ontario.

Observation.—Based on column only.

Cleocrinus perforatus (Hudson).

Cleocrinus perforatus Hudson, Bull. New York State Mus., 149, 1911, p. 211, figs. 2, 3.

Chazy (Valcour): Valcour Island, Lake Champlain, New York.

Cleocrinus regius Billings.

Cleocrinus regius Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 277; Geol. Surv. Canada, dec. 4, 1859, p. 53, pl. 5, figs. 1a-1g.—Miller, N. A. Geol. Pal., 1889, p. 232, fig. 264.—Springer, Mem. Mus. Comp. Zool., Harvard, 25, 1905, p. 110, pl. 1, figs. 1-10.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 562.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 41, pl. 5, figs. 7-9.

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

Cleocrinus sculptus Springer.

Cleocrinus sculptus Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 44, pl. 5, figs. 10a-f.

Trenton (Curdsville): Mercer County, Kentucky.

Cleocrinus tessellatus (Troost).

Campanulites tessellatus Troost, Amer. Jour. Sci. and Arts, 2d ser., 8, 1849, p. 419 (nom. nud.); Proc. Amer. Assoc. Adv. Sci., 1850, p. 60.

Cleocrinus tessellatus (Troost) Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 100, pl. 7, fig. 11.

Cleiocrinus tessellatus—Continued.

Cleiocrinus Libanus Safford, Geol. Tennessee, p. 285 (not defined).

Cleiocrinus levis Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 44, pl. 5, figs. 11a-c.

Stones River (Lebanon): Duck River near Columbia, and Shelbyville, Tennessee.

Holotype.—Cat. No. 39910, U.S.N.M.

CLEIONYCHIA Ulrich. See *Clionychia* Ulrich.

CLEIONYCHIA AMYGDALINA Ulrich. See *Ambonychia amygdalina*.

CLEIONYCHIA ATTENUATA Ulrich. See *Clionychia lamellosa*.

CLEIONYCHIA? *NITIDA* Ulrich. See *Mytilarca nitida*.

CLELANDIA Coessmann. Genotype: *Harrisia parabola* Cleland.

Harrisia Cleland; Bull. Amer. Pal., 3, 1900, p. 127 (255).

Clelandia (*Harrisia* preoccupied) Coessmann, Revue Critique de Paleozoologie, 6, 1902, p. 52.

Clelandia parabola (Cleland).

Harrisia parabola Cleland, Bull. Amer. Pal., 3, 1900, p. 127 (255), pl. 16, figs. 1-3; 4, 1903, p. 11, pl. 3, figs. 4, 5.

Canadian (Tribes Hill): Near Fort Hunter, New York.

CLEMATOCRINUS PARVUS Jaekel. See *Cordylocrinus plumosus*.

CLEMATOCRINUS PLUMOSUS Jaekel. See *Cordylocrinus plumosus*.

CLEMATOGRAPTUS MULTIBRACHIATUS Lapworth. See *Amphigraptus multifasciatus*.

CLEMATOGRAPTUS MULTIFASCIATUS Hopkinson. See *Amphigraptus multifasciatus*.

CLIDOCHIRUS Angelin.

Genotype: *C. pyrum* Angelin.

Clidochirus Angelin, Icon. Crin. Suec., 1878, p. 12.—Wachsmuth and Springer, Proc. Nat. Acad. Philadelphia, Rev. Pal., 1, 1879, p. 39.—Zittel, Handb. Pal., 1, 1879, p. 355.—Bather, Lankester's Treatise on Zool., 3, 1900, p. 188.—Springer, Amer. Geol., 30, 1902, p. 94; Jour. Geol., 14, 1906, pp. 479, 516; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 204; Mon. Crin. Flex., Smiths. Inst. (in press).

Clidochirus americanus Springer.

Clidochirus americanus Springer, Mon. Crin. Flex., Smiths. Inst. (in press).

Upper Medinan (Brassfield): Dayton, Ohio.

Clidochirus keyserensis Springer.

Clidochirus keyserensis Springer, Mon. Crin. Flex., Smiths. Inst. (in press).

Helderbergian (Keyser): Keyser, West Virginia.

CLIDOPHORUS Hall.

Genotype: *Nuculites planulata* Conrad.

Cleidophorus Hall, Pal. New York, 1, 1847, p. 300, footnote.—Pictet, Traite de Pal., 2d ed., 3, 1855, p. 534.—Meek and Hayden, Pal. Up. Missouri, Smiths. Cont. Knowl., 172, 14, 1865, p. 35.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 222.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th ser., 1, 1881, p. 224.—Zittel, Handb. Pal., 2, 1881, p. 53.—Dall, Zittel-Eastman Textb. Pal., 1, 1900, p. 363; 2d ed., 1913, p. 440.

Clidophorus McCoy, Brit. Pal. Rocks and Foss., 1854, p. 273.—Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 228 (extr. 1871, p. 5).—Miller, N. A. Geol. Pal., 1889, p. 471.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 606.—Cummings, 32d Ann. Rep. Geol. Nat. Res. Indiana, 1908, p. 979.

Nuculites Grabau and Shimer (part), N. A. Index Fossils, 1, 1909 p. 397.

Clidophorus brazilianus Clarke.

Clidophorus brazilianus Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Engl. ed., 1900, p. 18, pl. 2, figs. 17-19.
Silurian: Rio Trombetas, Brazil.

Clidophorus chicaoensis (Miller).

Clidophorus chicaoensis Miller, Jour. Cincinnati Soc. Nat. Hist., 3, 1881, p. 314, pl. 8, figs. 2, 2a.
Niagaran (Racine): Bridgeport and Cicero, Illinois.

Clidophorus concentricus Hall.

Clidophorus concentricus Hall, Canadian Nat. Geol., 5, 1860, p. 149, fig. 7.—Dawson, Acadian Geol., Suppl. Chap., 1860, p. 68, fig. 53; 2d ed., 1868, p. 600, fig. 204.
Silurian: Arisaig, Nova Scotia.

Clidophorus consuetus Ulrich.

Clidophorus consuetus Ulrich, 19th Ann. Rep. Geol. and Nat. Hist. Surv. Minnesota, 1892, p. 223, fig. 9; Geol. Minnesota, 3, pt. 2, 1894, p. 606, pl. 37, figs. 32, 33.
Trenton (Prosser): Near Wykoff, Minnesota.
Holotype.—Cat. No. 46110, U.S.N.M.

Clidophorus cuneatus Hall.

Clidophorus cuneatus Hall, Canadian Nat. Geol., 5, 1860, p. 148.—Dawson, Acadian Geol., 2d ed., 1868, p. 600.
Silurian: Arisaig, Nova Scotia.

Clidophorus ellipticus (Ulrich).

Clidophorus ellipticus Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 25, pl. 7, fig. 22.
Eden (Economy): Covington, Kentucky.
Holotype.—Cat. No. 46111, U.S.N.M.

Clidophorus elongatus Hall.

Clidophorus elongatus Hall, Canadian Nat. Geol., 5, 1860, p. 150, fig. 9.—Dawson, Acadian Geol., Suppl. Chap., 1860, p. 68, fig. 55; 2d ed., 1868, p. 601, fig. 206.
Silurian: Arisaig, Nova Scotia.

Clidophorus erectus Hall.

Clidophorus erectus Hall, Canadian Nat. Geol., 5, 1860, p. 149, fig. 8.—Dawson, Acadian Geol., Suppl. Chap., 1860, p. 68, fig. 54; 2d ed., 1868, p. 600, fig. 295.
Silurian: Arisaig, Nova Scotia.

Clidophorus faberi Miller.

Clidophorus faberi Miller, N. A. Geol. Pal., 1889, p. 471, fig. 795.
Richmond: Near Versailles, Indiana; Butler County, Ohio.

Clidophorus fabula (Hall).

Clidophorus (*Nucula*) *fabula* Hall, Amer. Jour. Sci. Arts, 43, 1845, p. 295.
Clidophorus (*Nuculites*?) *fabula* Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 138, pl. 11, figs. 10a, b.
Cleidophorus fabula Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 222.
Clidophorus fabula Miller, N. A. Geol. Pal., 1889, p. 471, fig. 796.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 996, pl. 44, figs. 6, 6a.
Eden—Richmond: Cincinnati, etc., Ohio; Indiana; Kentucky; Tennessee.
Observation.—*C. fabula* is possibly only a dwarfed form of *C. neglectus*.

Clidophorus ferrugineus (Foerste).

Nuculites (*Cleidophorus*) *ferrugineum* Foerste, Geol. Surv. Ohio, Pal., 7, p. 564, pl. 37, figs. 2a, b.

Upper Medinan (Brassfield): Todds Fork, Clinton County, Ohio.

Clidophorus foerstel Ruedemann.

Clidophorus foerstei Ruedemann, Bull. New York State Mus., 162, 1912, pl. 5, figs. 15, 16.

Trenton (Snake Hill): Snake Hill, Saratoga County, New York.

CLIDOPHORUS MCCHESEYANUS Winchell and Marcy. See *Matheria recta*.

Clidophorus neglectus Hall.

Clidophorus neglectus Hall, Geol. Surv. Wisconsin, 1, 1862, p. 55.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 607, pl. 42, figs. 20–25.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 165, pl. 2, fig. 16.

Nuculites neglectus Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 397, fig. 508a–c.

Richmond (Maquoketa): Lafayette County, Wisconsin; Illinois; Iowa; Minnesota; and Missouri; (?) Trenton of New Jersey.

Clidophorus nuculiformis Hall.

Clidophorus nuculiformis Hall, Canadian Nat. Geol., 5, 1860, p. 150.—Dawson, Acad. Geol., 2d ed., 1868, p. 601.

Silurian: Arisaig, Nova Scotia.

Clidophorus obscurus Raymond.

Clidophorus obscurus Raymond, Amer. Jour. Sci., 20, 1905, p. 372.

Chazyan: (Crown Point) Sloop Bay, Valcour Island, New York.

Clidophorus planulatus (Conrad).

Nuculites planulata Conrad, 5th Ann. Rep. New York Geol. Surv., 1841, p. 50.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 397.

Nuculites scitula Emmons, Nat. Hist. New York, Geol., 2, 1842, p. 399, fig. 2.

Periploma planulata D'Orbigny, Prodr. de Pal., 1, 1849, p. 11 (gen. ref.).—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 172, pl. 17, fig. 17; Manual Geology, 1860, p. 101, figs. 91, 92.

Cleidophorus planulatus Hall, Pal., New York, 1, 1847, p. 300, pl. 82, figs. 9a–e.—Pictet, Traité de Pal., 1855, 2d ed., 3, p. 534, pl. 79, fig. 18.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 36, fig. 11e.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 133, fig.

Clidophorus planulatus Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 302.

Eden and Maysville: Pulaski, etc., New York (Pulaski); Pennsylvania; Ohio; etc.

Clidophorus prævolutus Foerste.

Clidophorus prævolutus Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 303, pl. 1, figs. 6, 12.

Cincinnatian (Pulaski): Richelieu River, near Chambly, Quebec.

Clidophorus semiradiatus Hall.

Clidophorus semiradiatus Hall, Canadian Nat. Geol., 5, 1860, p. 150.—Dawson, Acad. Geol., 2d ed., 1868, p. 601.

Silurian: Arisaig, Nova Scotia.

Clidophorus subovatus Hall.

Clidophorus subovatus Hall, Canadian Nat. Geol., 5, 1860, p. 151.—Dawson, Acad. Geol., 2d ed., 1868, p. 602.

Silurian: Arisaig, Nova Scotia.

Clidophorus ventricosus Ruedemann.

Clidophorus ventricosus Ruedemann, Bull. New York State Mus., 162, 1912, pl. 5, figs. 11-14.

Trenton (Snake Hill): Snake Hill, Saratoga County, New York.

CLIFTONIA Foerste. See *Triplecia* subgenus *Cliftonia*.

CLIMACOGRAPTUS ANTENNARIUS Nicholson. See *Cryptograptus antennarius*.

CLIMACOGRAPTUS Hall.

Genotype: *Graptolithus bicornis* Hall.

Climacograptus Hall, Geol. Surv. Canada, dec. 2, 1865, p. 111.—Carruthers, Geol. Mag., 5, 1868, p. 73, 131.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 217.—Hopkinson, Geol. Mag., 7, 1870, p. 354.—Zittel, Handb. Pal., 1, 1879, p. 300.—Tullberg, Sveriges Geol. Unders., Ser. C, No. 55, 1883, p. 13, 14.—Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 561.—Miller, N. A. Geol. Pal., 1889, p. 178.—James, Jour. Cincinnati Soc. Nat. Hist., 14, pt. 2, 1892, p. 153.—Koken, Die Leitfossilien, Leipzig, 1896, p. 329.—Wiman, Bull. Geol. Inst., Univ. Upsala, 2, pt. 2, 1896, p. 264; Nat. Sci., 9, 1896, p. 188.—Roemer and Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 608.—Gurich, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 13, 1900, p. 333.—Zittel-Eastman Textb. Pal., 1, 1900, p. 119.—Ruedemann, Mem. New York State Mus., 7, 1904, p. 729; 11, pt. 2, 1908, pp. 400-406.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 31.—Ruedemann, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 130.

Climacograptus Nicholson, Ann. Mag. Nat. Hist., 4th ser., 6, 1870, p. 370; Mon. British Grapt., 1872, p. 117.

CLIMACOGRAPTUS ANTENNARIUS Hall. See *Cryptograptus antennarius*.

Climacograptus antiquus Lapworth.

Climacograptus antiquus Lapworth, Geol. Mag., 10, 1873, p. 134 (nom. nud.); Trans. Roy. Soc. Canada, 5, sec. 4, 1886, p. 178.—Gurley, Jour. Geol., 6, 1896, pp. 74, 93, 207.—Elles and Wood, Mon. British Grapt., pt. 5, 1906, pp. 199, 200, fig. 130; pl. 27, fig. 4a-e.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 239-441, pl. 28, figs. 28, 29.

Climacograptus cf. *antiquus* Lapworth, Rep. Geol. Surv. Canada, 3, pt. 1, 1889, p. 95B.

Climacograptus cælatus Lapworth, Cat. West. Scotland Foss., 1876, p. 6, pl. 1, fig. 56; Ann. Rep. and Proc. Belfast Nat. Field Club, 1, pt. 4, 1877, p. 130, pl. 6, fig. 39; Science, 9, 1887, p. 320.

Middle Ordovician (Glenkiln): Great Britain.

Ohazyan (Normanskill): Canada, Nevada, Arkansas, Oklahoma, etc.

Plesiotypes.—Cat. Nos. 54285, 54339, 54248, U.S.N.M

Climacograptus bicornis (Hall).

Graptolithus bicornis Hall, Pal. New York, 1, 1847, p. 268, pl. 73, figs. 2a-s.—Ford, Amer. Jour. Sci., 3d ser., 28, 1884, p. 206.

Diplograptus bicornis Geinitz, Die Graptolithen, 1852, p. 24.—McCoy, Ann. Mag. Nat. Hist., 9, 1862, p. 139.

Diplograptus bicornis Nicholson, Ann. Mag. Nat. Hist., 1, 1868, p. 56, pl. 3, figs. 8-10.

Diplograptus (*Climacograptus*) *bicornis* McCoy, Prodr. Pal. Victoria, dec. 1, 1874, p. 12, pl. 1, fig. 8.

Climacograptus (*Diplograptus*) *bicornis* Etheridge, Mem. Geol. Surv. Great Britain, 2d ed., 3, 1881, p. 530, pl. 11A, fig. 1b, c.

Climacograptus bicornis—Continued.

Climacograptus bicornis Hall, Canadian Org. Rem. Geol. Surv. Canada, dec. 2, 1865, p. 112, pl. A; figs. 1a-c.—Nicholson, Ann. Mag. Nat. Hist., 6, 1870, p. 380, fig. 5; Mon. British Grapt., 1872, p. 61, figs. 29a-d.—Lapworth, Cat. West. Scotland Foss., 1876, p. 6, pl. 2, fig. 51; Rep. and Proc. Belfast Nat. Field Club, 1, pt. 4, 1877, p. 139, pl. 6, fig. 38a.—Whitfield, U. S. Geol. Surv. West 100th Merid., Wheeler's Rep. Pal., 4, 1877, p. 19.—Lapworth, Quart. Jour. Geol. Soc. London, 34, 1878, p. 250.—Linnarsson, Sver. Geol. Und., Ser. C, No. 31, 1879, p. 18.—Lapworth, Ann. Mag. Nat. Hist., 6, 1880, p. 22.—Tullberg, Sver. Geol. Und., Ser. C, No. 41, 1880; No. 50, 1882, p. 20.—Walcott, Trans. Albany Inst., 10, 1883, p. 3, (adv. sheets, 1879, p. 34).—Whitfield, Amer. Jour. Sci., 3d ser., 26, 1883, p. 380.—Lapworth, Trans. Roy. Soc. Canada, 4, 1887, 178f.—Miller, N. A. Geol. Pal., 1889, p. 178, fig. 153.—Ami, Rep. Canadian Geol. Surv., 2d ser., 3, pt. 2, 1889, p. 117K.—Gurley, Ann. Rep. Geol. Surv. Arkansas, 3, 1892, p. 410.—James, Jour. Cincinnati Soc. Nat. Hist., 14, 1892, pt. 2, p. 159.—Ami, Canadian Rec. Sci., 5, 1893, pp. 237, 239.—Gurley, Jour. Geol., 4, 1896, p. 297.—T. S. Hall, Proc. Roy. Soc. Victoria, 9, 1897, p. 184.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 148 (loc. occ.).—Roemer and Frech, Leth. Geog., 1 Theil, Leth. Pal., 1, 1897; pp. 610, 611, fig. 174.—Frech, Leth. Geog., 1 Theil, Leth. Pal., 1, 3 Lief, 1897, p. 553, fig. 131.—T. S. Hall, Geol. Mag., n. s., dec. 4, 6, 1899, p. 445.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 496ff.—Clark, Geol. Mag., 4th ser., 9, 1902, p. 498.—T. S. Hall, Geol. Surv. Victoria, Rec., 1, pt. 1, 1902, p. 34.—Dale, Bull. U. S. Geol. Surv., 242, 1904, p. 33.—T. S. Hall, Proc. Roy. Soc. Victoria, 18, pt. 1, 1905, p. 21.—Ami, Geol. Surv. Canada, Sum. Rep., 1904, p. 12.—T. S. Hall, Geol. Surv. Victoria, Rec., 1, pt. 4, 1906, p. 275, pl. 34, fig. 8.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 32, figs. 50, 51a.—Elles and Wood, Mon. British Grapt., pt. 5, 1906, pp. 193, 194, fig. 126, pl. 26, fig. 8a-f.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 433-437, pl. 28, figs. 24-26, figs. 404, 405.

Climacograptus bicornis var. *peltifer* Lapworth, Cat. West. Scotland Foss., 1876, p. 6, pl. 2, fig. 53; Rep. and Proc. Belfast Field Club, 2d ser., 1, pt. 4, 1877, p. 139, pl. 6, fig. 38b.—Gurley, Jour. Geol., 4, 1896, p. 93.

Climacograptus bicornis var. *tridentatus* Lapworth, Cat. West. Scotland Foss., 1876, p. 6, pl. 2, fig. 52; Rep. and Proc. Belfast Field Club, 2d ser., 1, pt. 4, 1877, p. 139, pl. 6, fig. 38c.—Gurley, Jour. Geol., 4, 1896, p. 93.

Climacograptus bicornis var. *tuberculatus* Lapworth, Cat. West. Scotland Foss., 1876, p. 6.

Climacograptus bicornis var. *longispina* T. S. Hall, Geol. Surv. New South Wales, Rec., 7, pt. 2, 1902, p. 5, pl. 12, figs. 8, 9.

Chazy (Normanskill): New York slate belt, north into Quebec and New Brunswick and south to Virginia and Alabama; Arkansas (Stringtown).

Middle Ordovician: Great Britain, Scandinavia, Australia.

CLIMACOGRAPTUS BICORNIS Hall (part). See *Climacograptus parvus*.

CLIMACOGRAPTUS BICORNIS var. *CAUDATUS* Ami. See *Climacograptus caudatus*.

CLIMACOGRAPTUS BICORNIS var. *LONGISPINA* Hall. See *Climacograptus bicornis*.

CLIMACOGRAPTUS BICORNIS var. *PELTIFER* Lapworth. See *Climacograptus bicornis*.

CLIMACOGRAPTUS BICORNIS var. *TRIDENTATUS* Lapworth. See *Climacograptus bicornis*.

CLIMACOGRAPTUS BICORNIS TUBERCULATUS Nicholson. See *Climacograptus bicornis*.

Climacograptus cælatus Lapworth. See *Climacograptus antiquus*.

Climacograptus caudatus Lapworth.

Climacograptus caudatus Lapworth, Cat. West. Scotland Foss., 1876, p. 6, pl. 2, fig. 48; Rep. and Proc. Belfast Field Club, 1, pt. 4, 1877, p. 138, pl. 6, fig. 34.—Linnarsson, Sver. Geol. Und. Ser. C, No. 31, 1879, p. 18.—Lapworth, Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 358; 6, p. 22.—Tullberg, Sver. Geol. Und., Ser. C, No. 50, 1882, p. 20.—Lapworth, Geol. Mag., 3d ser., 6, pl. 2, 1889.—Gurley, Hour. Geol., 4, 1896, p. 297.—Roemer and Frech, Leth. Geog., Leth. Pal., 1, 1897, p. 614, fig. 179.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 520.—Elles and Wood, Mon. British Grapt., pt. 5, 1906, p. 202, fig. 133; pl. 27, fig. 7.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 438, 439, pl. 28, figs. 17, 18, fig. 406.

Climacograptus bicornis var. *caudatus* Ami, Canadian Geol. Surv. Rep., 2d ser., 3, pt. 2, 1889, p. 116K.

Middle Ordovician shales: Great Britain and Scandinavia.

Trenton: Magog, Quebec (Magog); Mechanicsville, New York (Snake Hill).

Climacograptus caudatus laticaulis Gurley.

Climacograptus caudatus laticaulis Gurley, Jour. Geol., 4, 1896, pp. 75, 93 (nom. nud.).

Trenton (Magog): Magog, Quebec.

Climacograptus caudatus posterus Ruedemann.

Climacograptus caudatus mut. *posterus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 51 (nom. nud.).

Trenton shale of New York.

Climacograptus kamptotheca Gurley.

Climacograptus kamptotheca Gurley, Jour. Geol., 4, 1896, p. 76.

Trenton (Magog): Magog, Quebec.

Climacograptus mississippiensis Ruedemann.

Climacograptus mississippiensis Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 413, 414, pl. 28, fig. 13, text fig. 367.

Richmond (Sylvan): Arbuckle Mountains, Oklahoma.

Holotype and *paratype*.—Cat. No. 54268, U.S.N.M.

Climacograptus modestus Ruedemann.

Climacograptus modestus Ruedemann, Mem. New York State Mus., 11, 1908, pt. 2, pp. 432, 433, pl. 28, fig. 30, 400–403.

Chazy (Normanskill): Mount Moreno, near Hudson, and Lansingburg, New York; Arkansas (Stringtown).

Climacograptus oligotheca Gurley.

Climacograptus oligotheca Gurley, Jour. Geol., 4, 1896, p. 76.

Climacograptus cf. *oligotheca* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 441, pl. 28, fig. 27.

Trenton: Magog, Quebec (Magog); Arkansas.

*Plesio*type.—Cat. No. 54264, U.S.N.M.

Climacograptus parvus Hall.

Climacograptus bicornis Hall, Pal. New York, 1, 1847, pl. 73, figs. 2a, k, o-s.

Climacograptus parvus Hall, Canadian Org. Rem., dec. 2, 1865, p. 57 (nom. nud.); 20th Rep. New York State Cab. Nat. Hist., 1868, p. 224.—Walcott, Trans. Albany Inst., 10, 1883 (adv. sheets 1879, p. 34); Bull. Geol. Soc. Amer., 1,

***Climacograptus parvus*—Continued.**

- 1890, p. 339.—Roemer and Frech, *Leth. geog.*, *Leth. Pal.*, 1, 1897, p. 610.—Ruedemann, *Bull. New York State Mus.*, 42, 1901, p. 523ff.—Dale, *Bull. U. S. Geol. Surv.*, 242, 1904, p. 33.—Ruedemann, *Mem. New York State Mus.* 11, pt. 2, 1908, pp. 426–428, pl. 28, figs. 19–23, figs. 388–393.
- Climacograptus phyllophorus* Gurley, *Jour. Geol.*, 4, 1896, p. 77, pl. 4, figs. 4–6.—Weller, *Geol. Surv. New Jersey, Pal.*, 3, 1903, p. 212, pl. 16, figs. 14, 15.
- Chazy (Normanskill): Glenmont, Mount Moreno, Troy, etc., New York; New Jersey.

CLIMACOGRAPTUS phyllophorus Gurley. See *Climacograptus parvus*.

***Climacograptus pungens* Ruedemann.**

- Climacograptus* n. sp. Ruedemann, *Ann. Rep. New York State Pal.*, 1902, p. 571.
- Climacograptus pungens* Ruedemann *Mem. New York State Mus.*, 7, pt. 1, 1904, p. 730, pl. 16, figs. 14–20.
- Canadian: Deepkill, and Mount Moreno, New York (Deepkill, *Diplograptus dentatus* zone); Point Levis, Quebec (Levis, *D. dentatus* zone).

***Climacograptus (Mesograptus) putillus* (Hall).**

- Graptolithus putillus* Hall, *Geol. Surv. Canada, Org. Rem.*, dec. 2, 1865, pp. 27, 44, pl. A, figs. 10–12a.
- Graptolithus (Diplograptus) putillus* Hall, 20th *Ann. Rep. New York State Cab. Nat. Hist.*, 1868, pp. 195, 211, pl. 2, figs. 10–12a; rev. ed., 1868 (1870) pp. 224, 225, 226; pl. 2, figs. 10–12.—Winchell and Schuchert, *Geol. Minnesota*, 3, pt. 1, 1895, p. 82, fig. 3.
- Diplograptus putillus* Nicholson, *Quart Jour. Geol. Soc. London*, 24, 1868, p. 527, pl. 19, figs. 17, 18.—Tullberg, *Sver. Geol. Unders.*, Ser. C, No. 50, 1882, p. 43.—Walcott, *Trans. Albany Inst.*, 10, 1883 (adv. sheets 1879, p. 35).—Lapworth, *Proc. and Trans. Roy. Soc. Can.*, 4, 1886, p. 170.—Walcott, *Bull. Geol. Soc. Amer.*, 1, 1890, p. 339.—Ami, *Canadian Rec. Sci.*, 5, 1893, p. 244.—Gurley, *Jour. Geol.*, 4, 1896, p. 298.—Winchell and Ulrich, *Geol. Minnesota*, 3, pt. 2, 1897, p. 111.—Ruedemann, *Bull. New York State Mus.*, 42, 1901, p. 498.—Nickles, *Jour. Cincinnati Soc. Nat. Hist.*, 20, 1902, p. 68.
- Climacograptus putillus* Ruedemann, *Mem. New York State Mus.*, 11, pt. 2, 1908, pp. 415–419, pl. 28, figs. 14, 15, text figs. 368–374, 376, 377.
- Diplograptus (Mesograptus) putillus* Ruedemann, *Bull. New York State Mus.*, 162, 1912, p. 80.
- Diplograptus teretiusculus* var. *putillus* Roemer and Frech, *Leth. Pal.*, 1, 1896, p. 628.
- Trenton-Richmond: Maquoketa Creek, Iowa (Maquoketa); Canada; New York; Vermont; Ohio; Minnesota; etc.
- Plesiotype*.—Cat. No. 54272, U.S.N.M.

***Climacograptus (Mesograptus) putillus eximius* Ruedemann.**

- Cf. *Diplograptus putillus* Lapworth, *Proc. and Trans. Roy. Soc. Canada*, 4, 1886, pp. 170, 178ff.
- Diplograptus* aff. *putillus* Ruedemann, *Bull. New York State Mus.*, 42, 1901, p. 541.
- Climacograptus putillus* mut. *eximius* Ruedemann, *Mem. New York State Mus.*, 11, pt. 2, 1908, p. 420, pl. 28, figs. 16, 378–384.
- Chazy (Normanskill): Glenmont and Lansingburg, New York; Tartigo River, Cape Rouge, St. Lawrence region, Canada.

***Climacograptus scalaris annulatus* Ruedemann.**

- Climacograptus scalaris* var. *annulatus* Ruedemann, *Mem. New York State Mus.*, 11, pt. 2, 1908, p. 421, pl. 28, fig. 32, figs. 385–387.

***Climacograptus scalaris annulatus*—Continued.**

Boulder of Clinton (?) sandstone: Aroostook, Maine.

Observation.—For bibliography of *C. scalaris* which has not been found in America, see Ruedemann, op. cit., 1908, p. 421.

***Climacograptus scharenbergi* Lapworth.**

Climacograptus scharenbergi Lapworth, Cat. West. Scot. Foss., 1876, p. 6, pl. a, fig. 35; Rep. and Proc. Belfast Field Club, 2d ser., 1, pt. 4, 1877, p. 138, pl. 6, fig. 36.—Linnarsson, Sver. Geol. Unders. Ser. C. No. 31, 1879, p. 18.—Tullberg, ibid., No. 50, 1882, p. 214.—Lapworth, Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 276; Proc. and Trans. Roy. Soc. Canada, 4, 1887, p. 180; Geol. Mag., 3d ser., 6, 1889, pl. 2.—Tornquist, Sartr. Kongl. Fys. Sällsk. Lund. Handl., IV, 1893, p. 8, pl. 1, fig. 28.—Gurley, Jour. Geol., 4, 1896, p. 298.—Roemer and Frech, Leth. geog., Leth. Pal., 1, 1897, p. 609, fig. 176.—Elles Quart. Journ. Geol. Soc. London, 54, 1898, p. 519.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 541ff, pl. 1, fig. 1; 49, p. 11, pl. 3, fig. 1.—Clark, Geol. Mag., 4th ser., 9, 1902, p. 498.—Elles and Wood, Mon. British Grapt., pt. 5, 1906, pp. 206, 207, fig. 139; pl. 27, fig. 14.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 428–431, pl. 28, fig. 31, figs. 394–399.

Middle Ordovician slates: Great Britain and Scandinavia.

Chazy (Normanskill): New York; Canada; Tennessee; etc.

***Climacograptus spiniferus* Ruedemann.**

Climacograptus typicalis mut. *spinifer* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 411, 412, pl. 28, figs. 8, 9, fig. 236.

Climacograptus spiniferus Ruedemann, Bull. New York State Mus., 162, 1912, p. 84.

Trenton: Ballston, Saratoga, Sandy Hill, etc., New York (Canajoharie, Snake Hill, and Schenectady); Macasty Bay, Anticosti (Macasty).

Martinsburg (base): Virginia, etc.

***Climacograptus typicalis* Hall.**

Climacograptus typicalis Hall, Geol. Surv. Canada, Can. Org. Rem., dec. 2, 1865, p. 27, pl. A, figs. 1–9.—Hall, 20th Ann. Rep., New York State Cab. Hist., rev. ed., 1868, p. 224, pl. 2, figs. 1–9.—Zittel, Handb. Pal., 1, Munich, 1879, p. 292, fig. 197; p. 300, fig. 208 a–c.—Walcott, Trans. Albany Inst., 5, 1883, p. 10 (Advance sheets, 1879, p. 34).—Ulrich, Amer. Geology, 1, 1888, p. 183.—Walcott, Bull. Geol. Soc. Amer., 1, 1890, p. 339.—James, Jour. Cincinnati Soc. Nat. Hist., 14, 1892, p. 159.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 82, text, fig. 4.—Gurley, Jour. Geol., 4, p. 298.—Roemer and Frech, Leth. geog., Leth. Pal., 1, 1897, p. 612.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 523.—Nickles, Jour. Cincinnati Soc. Nat. Hist., 20, 1902, p. 68.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 407–411, pl. 28, figs. 6, 7, figs. 354, 356–358, 362.

Climacograptus typicus Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 32, fig. 51 b.

Trenton–Eden: New York, Canada, Ohio, Minnesota, etc.

Plesiotypes.—Cat. No. 54276, U.S.N.M.

***Climacograptus typicalis magnificus* Twenhofel.**

Climacograptus typicalis magnificus Twenhofel, Bull. Victoria Mem. Mus., 3, 1914, p. 23.

Trenton (Macasty): Macasty Bay, Anticosti.

CLIMACOGRAPTUS TYPICALIS SPINIFER Ruedemann. See *Climacograptus spiniferus*.

CLIMACOGRAPTUS TYPICUS Grabau and Shimer. See *Climacograptus typicalis*.

Climacograptus ulrichi Ruedemann.

Climacograptus ulrichi Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 412, 413, pl. 28, fig. 11.

Richmond: Spencer, Missouri (Maquoketa); Oklahoma (Sylvan).

Holotype and *paratype*.—Cat. No. 54276, U.S.N.M.

CLIMACOSPONGIA Hinde.

Genotype: *C. radiata* Hinde.

Climacospongia Hinde, Cat. Foss. Sponges British Mus., 1883, p. 18.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 223.—Rauff, Palæontographica, 41, 1895, p. 243, footrote.

Climacospongia radiata Hinde.

Climacospongia radiata Hinde, Cat. Foss. Sponges British Mus., 1883, p. 18, pl. 1, figs. 1, 1a.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 224.

Niagara (Brownsport): Perry County, Tennessee.

CLIMACTICHNITES Logan.

Genotype: *C. wilsoni* Logan.

Climactichnites Logan, Canadian Nat. Geol., 5, 1860, pp. 279-285, figs. 1-5.—Dawson, *ibid.*, 7, 1862, p. 274.—Jones, The Geologist, London, 5, 1862, pp. 138-139.—Chapman, Expos. Min. and Geol. Canada, 1864, p. 160.—Billings, Quart. Jour. Geol. Soc. London, 26, 1870, p. 485.—Chapman, Canadian Jour. Sci., 15, 1877, pp. 486-490.—Nathorst, Kongl. Sven. Vet.-Akad. Handl., 18, No. 7, 1881, pp. 47, 99.—Todd, Trans. Wisconsin Acad. Sci., 5, 1882, pp. 276-281.—Dawson, Quart. Jour. Geol. Soc. London, 46, 1890, pp. 596 and 600.—Woodworth, Bull. New York State Mus., 69, 1903, pp. 956-966.—Clarke, Bull. New York State Mus., 80, 1905, pp. 18-20, pl. 3.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 248.—Walcott, Smiths. Misc. Coll., 57, No. 9, 1912, p. 259, pls. 38-40.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 142.

Climactichnites fosteri Todd.

Climactichnites Fosteri Todd, Trans. Wisconsin Acad. Sci., 5, 1882, p. 280, 277, fig. 1.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 132, fig.

Upper Cambrian (? Ozarkian): Near New Lisbon, Wisconsin.

Climactichnites wilsoni Logan.

Climactichnites Wilsoni Logan, Canadian Nat. Geol., 5, 1860, pp. 279-285, figs. 1-5; Amer. Jour. Sci., 31, 1861, pp. 17-23, figs. 1-5.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 107, fig. 18.—Chapman, Canadian Jour., n. s., 8, 1863, p. 188, fig. 157; Expos. Min. Geol. Canada, 1864, p. 160, fig. 157.—Marsh, Proc. Amer. Assoc. Adv. Sci., 17, 1879, p. 322.—Logan, 42d Rep. New York State Mus. Nat. Hist., 1889, p. 30, figs. 1-5.—Miller, N. A. Geol. Pal., 1889, p. 538, fig. 985.—Packard, Proc. Amer. Acad. Arts and Sci., 36, 1900, p. 64.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 248.—Walcott, Smiths. Misc. Coll., 57, 1912, p. 286, pl. 40.

Upper Cambrian or Ozarkian (Potsdam): Perth, Ontario; New York.

Climactichnites youngi Todd.

Climactichnites Youngi Todd, Trans. Wisconsin Acad. Sci., 5, 1882, p. 280, fig. 1.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 132, fig.—Walcott, Smiths. Misc. Coll., 57, 1912, p. 282, pls. 38, 39.

Upper Cambrian (?Ozarkian): Near New Lisbon, Wisconsin.

CLINOCERAS Mascke.Genotype: *C. dens* Mascke.

Clinoceras Mascke, Zeits. d. d. geol. Gesell., 28, 1876, p. 49.—Zittel, Handb. Pal., 2, Munich, 1884, p. 370.—Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 282.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 126.

CLINOCERAS EXIGUUM Schuchert. See *Oncoceras exiguum*.

Clinoceras mumiaforme (Whitfield).

Oncoceras mumiaforme Whitfield, Ann. Rep. Geol. Surv. Wisconsin for 1879, 1880, p. 58; Geol. Wisconsin, 4, 1882, p. 232, pl. 7, figs. 3-5.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 159, fig.

Clinoceras mumiaforme Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1883, p. 282 (gen. ref.).—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 797, pl. 57, figs. 7-10.—Grabau and Shimer, N. A. Index Fossil, 2, 1910, p. 126, fig. 1371.

Black River (Platteville): Beloit and Janesville, Wisconsin.

CLINOPISTHA Meek and Worthen.Genotype: *C. laevis* Meek and Worthen.

Clinopistha Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1870, p. 43.—Hall, Pal. New York, 5, pt. 1, Lam. 2, 1885, p. liv.—Koninck, Ann. Mus. Roy. Hist. Nat. Belgique, 11, 1885, p. 125.—Miller, N. A. Geol. Pal., 1889, p. 472.—Hind, Mon. Brit. Carb. Lamellibranchiata, 1, Pal. Soc., 1900, p. 437.

Clinopistha antiqua Whiteaves.

Clinopistha? antiqua Whiteaves, Pal. Foss. Geol. Surv. Canada, 3, pt. 3, 1897, p. 185, pl. 20, fig. 6.

Black River or Richmond: Inmost or Birch Island, Kinnow Bay, Lake Winnipeg.

CLINTONELLA Hall and Clarke.Genotype: *C. vagabunda* Hall and Clarke.

Clintonella Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 159; 13th Ann. Rep. New York State Geol., 1895, p. 814.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 759.

Clintonella vagabunda Hall and Clarke.

Clintonella vagabunda Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 160, pl. 52, figs. 1-11; 48th Rep. New York State Mus. for 1895, 2, 1897, p. 361, pl. 9, figs. 17-26; 14th Rep. State Geol. New York for 1894, 1897, p. 361, pl. 9, figs. 17-26.

Clinton (drift): Orleans County, New York.

CLIOCINUS Hudson. See *Cleiocrinus* Billings.

CLIODERMA Hall. See *Pterotheca* Koken.

CLIONYCHIA Ulrich.Genotype: *Ambonychia lamellosa* Hall.

Ambonychia Hall (part), Pal. New York, 1, 1847, p. 163.

Cleionychia Ulrich, Amer. Geology, 10, 1892, p. 97.

Clionychia Miller, N. A. Geol. Pal., 1st App. 1892, p. 699.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 493; Geol. Surv. Ohio, 7, 1893, p. 650.—Dall, Zittel-Eastman Textb. Pal., 1, 1900, p. 368; 2d ed., 1913, p. 445.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 979.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 435.

Clionychia erecta (Hall).

Ambonychia erecta Hall, Rep. Supt. Geol. Surv. Wisconsin, 1891, p. 32.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 59, pl. 7, figs. 1, 2.

Clionychia erecta Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 496, pl. 35, figs. 17, 18. Black River (Platteville): Beloit, Wisconsin; Minneapolis, Minnesota.

Pterio-type.—Cat. No. 46112, U.S.N.M.

***Clionychia excavata* Ulrich.**

Clionychia excavata Ulrich, Geol. Surv. Ohio, 7, 1893, p. 651, pl. 51, figs. 4, 5.—
Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 997, pl. 44,
figs. 4, 4a.

Ambonychia excavata Miller, N. A. Geol. Pal., 2d App., 1897, p. 779 (gen. ref.).
Richmond (Whitewater): Richmond, Indiana.

Holotype.—Cat. No. 46113, U.S.N.M.

***Clionychia(?) gibbosa* Whiteaves.**

Clionychia(?) gibbosa Whiteaves, Ottawa Nat., 22, 1908, p. 109, pl. 3, figs. 5, 6.
Black River (Lowville): Hog Back, Ottawa, Ontario.

***Clionychia lamellosa* (Hall).**

Ambonychia lamellosa Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 31 (can-
cellosa in error).—Whitfield, Geol. Rep. Wisconsin, 4, 1882, p. 205, pl. 5,
fig. 5; Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 57, pl. 7, figs. 5-7.

Clionychia lamellosa Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 494, pl. 35, figs.
10-14.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 435, fig. 569a.

Ambonychia attenuata Whitfield, Geol. Rep. Wisconsin, 4, 1882, p. 206, pl. 5,
fig. 6.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 156, fig.—Whitfield, Mem.
Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 59, pl. 7, figs. 8-11.

Cleionychia attenuata Ulrich, Amer. Geol., 10, 1892, p. 97 (gen. ref.).

Black River (Platteville): Mineral Point, Beloit, Janesville, etc., Wisconsin;
Minneapolis, etc., Minnesota.

Pleriotypes.—Cat. Nos. 46114-46116, U.S.N.M.

***Clionychia marginalis* Raymond.**

Clionychia marginalis Raymond, Amer. Jour. Sci., 20, 1905, p. 373.

Chazyan (Day Point): Chazy and Valcour Island, New York.

***Clionychia mytiloides* (Hall).**

Ambonychia mytiloides Hall, Pal. New York, 1, 1847, p. 315, pl. 33, figs. 2a-b.

Cleionychia mytiloides Ulrich, Amer. Geol., 10, 1892, p. 97 (gen. ref.).

Chazyan: Chazy, New York.

***Clionychia nitida* Ulrich.**

Clionychia nitida Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 495, pl. 35, figs. 15, 16.

Black River (Platteville): Minneapolis, Minnesota.

***Clionychia ottawaensis* Whiteaves.**

Clionychia ottawaensis Whiteaves, Ottawa Nat., 22, 1908, p. 108, pl. 3, fig. 4.

Black River (Lowville): Hog Back, Ottawa, Ontario.

***Clionychia rhomboidea* (Ulrich).**

Cleionychia rhomboidea Ulrich, Amer. Geol., 10, 1892, p. 97.

Clionychia rhomboidea Miller, N. A. Geol. Pal., 1st App., 1892, p. 699, fig. 1257.—

Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 496, pl. 35, figs. 19, 20.

Black River (Platteville): Minneapolis, Minnesota.

Platotype.—Cat. No. 46117, U.S.N.M.

***Clionychia subundata* Ulrich.**

Clionychia subundata Ulrich, Geol. Surv. Ohio, 7, 1893, p. 651, fig.

Ambonychia subundata Miller, N. A. Geol. Pal., 2d App., 1897, p. 779 (gen. ref.).

Trenton (Upper): Mouth of Licking River, Covington, Kentucky.

Holotype.—Cat. No. 46118, U.S.N.M.

***Clionychia superba* (Billings).**

Ambonychia superba Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 50, fig. 16.

Cleionychia? superba Ulrich, Amer. Geol., 10, 1892, p. 97 (gen. ref.).

Gamachian (Ellis Bay): Junction Cliff, Anticosti.

Plasotype.—Cat. No. 46910, U.S.N.M.

***Clionychia undata* (Emmons).**

Pterinea undata Emmons, Geol. Rep. New York, 2, 1842, p. 395, fig. 1.—Owen, Amer. Jour. Sci. and Arts, 47, 1844, p. 369, fig. 1; p. 366, fig.

Ambonychia undata Hall, Pal. New York, 1, 1847, p. 165, pl. 36, figs. 7a-b.—Hitchcock, Geol. Vermont, 1, 1861, p. 296, fig. 205.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 23, fig.

Cleionychia undata Ulrich, Amer. Geol., 10, 1892, p. 97 (gen. ref.).

Clionychia undata Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 497, pl. 35, figs. 21, 22.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 435, fig. 569b.

Posidonomya subundata Emmons, Amer. Geology, 1, pt. 2, 1855, p. 177, pl. 13, figs. 23, 25.

Trenton: Watertown, etc., New York; Fillmore and Goodhue Counties, Minnesota (Prosser).

Plasotype.—Cat. No. 46119, U.S.N.M.

***CLIOPTERIA* Williams.**

Genotype: *Cliopecteria bicostata* Williams.

Cliopecteria Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 391.

***Cliopecteria bicostata* Williams.**

Cliopecteria bicostata Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 392, pl. 50, figs. 1, 2, 7.

Silurian (Pembroke): Youngs Cove, Washington County, Maine.

Cotypes.—Cat. No. 58441, U.S.N.M.

***Cliopecteria unicastata* Williams.**

Cliopecteria unicastata Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 393, pl. 50, figs. 3, 4, 6.

Silurian (Pembroke): Youngs Cove, Washington County, Maine.

Cotypes.—Cat. No. 58442, U.S.N.M.

***CLISIOPHYLLUM* Dana.**

Genotype: *C. danaanum* Edwards and Haime.

Clisiophyllum Dana, Wilkes' U. S. Expl. Exped. 1838-42, 7, 1846, p. 361, pl. 26, figs. 6, 7; Amer. Jour. Sci. and Arts, 2d ser., 1, 1846, p. 187, fig. 2.—Edwards and Haime, Mon. Polyp. Foss. Terr. Pal. (Arch. Mus. d'Hist. Nat., 5), 1851, pp. 170, 409.—Billings, Canadian Jour., n. s., 4, 1859, p. 128.—Milne-Edwards, Hist. Nat. Corall., 3, 1860, p. 402.—Dybowsky, Archiv. f. Nat. Liv-, Ebst- und Kurl., 5, 1873, p. 338.—Nicholson, Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 20.—Thomson and Nicholson, Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 71, fig. E.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 110.—Zittel, Handb. Pal., 1, p. 232.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 384.—Hall, 12th Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 299.—Miller, N. A. Geol. Pal., 1889, p. 179.—Koken, Die Leitfossilien, Leipzig, 1896, p. 309.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 173.

***CLISIOPHYLLUM AUSTINI* Houghton.** See *Acervularia austini*.

***Clisiophyllum danaanum* Edwards and Haime.**

Clisiophyllum danaanum Edwards and Haime, Mon. Polyp. Foss. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, p. 412.—Milne-Edwards, Hist. Nat. Corall., 3, 1860, p. 404.

Silurian: Perry County, Tennessee.

CLISOSPIRA Billings.Genotype: *C. curiosa* Billings.

Clisospira Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 186.—Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 307.—Koken, Neues Jahrb. f. Min., Geol. Pal., Beilage, 6, 1889, p. 435.—Miller, N. A. Geol. Pal., 1889, p. 400.—Koken, Bull. Acad. Imp. Sci. St. Petersburg, 7, 1897, p. 199.

Clisospira bassleri Raymond.

Clisospira bassleri Raymond, Ann. Carnegie Mus., 4, 1908, p. 214, pl. 54, figs. 16, 17.
Chazy (Day Point?): Isle La Motte, Vermont.
Holotype.—Cat. No. 53631, U.S.N.M.

Clisospira curiosa Billings.

Clisospira curiosa Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 186, fig. 167, p. 420, App., fig. 401, a, b.—Miller, N. A. Geol. Pal., 1889, p. 400, fig. 661.
Clisospira curiosa Clarke, Amer. Geol., 13, 1894, p. 331.
Canadian (Beekmantown): Near St. Antonie, above Quebec, Canada.

Clisospira lirata Whitfield.

Clisospira lirata Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 308, pl. 24, figs. 16, 17.
Clisospira (*Onychocheilus*?) *lirata* Clarke, Amer. Geology, 13, 1894, p. 331.
Clisospira lirata Seely, Rep. State Geol. Vermont, 7, 1910, pl. 62, figs. 16, 17.
Canadian (Beekmantown): Fort Cassin, Vermont.

Clisospira occidentalis Whitfield.

Clisospira occidentalis, Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1877, 1878, p. 75; Geol. Wisconsin, 4, 1882, p. 222, pl. 5, fig. 21.
Clisospira occidentalis Clarke, Amer. Geol., 13, 1894, p. 331.
Black River (Platteville): Beloit, Wisconsin.

CLITAMBONITES Pander.Genotype: *Pronites adscendens* Pander.

Klitambonites Pander, Beitrage zur Geognosie des Russischen Reiches, 1830, p. 70, pl. 3, fig. 14; pl. 28, figs. 16, 17.
Clitambonites Ehlert, Fischer's Manuel de Conchyliologie, 1837, p. 1289, fig. 1059.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 233.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 687.—Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 377.—Hall and Clarke, 11th Ann. Rep. New York State Geol., 1894, p. 274.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 320; 2d ed., 1913, p. 392.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 270.
Orthisina D'Orbigny, Compt. Rend. de l'Acad. Sci., 25, 1847, p. 267; Prod. Pal., 1, 1849, p. 16.—Davidson, British Foss. Brach., Pal. Soc., 1853, p. 104.—Woodward, Man. Mollusca, pt. 2, 1854, p. 230, fig. 148.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 57.—Chapman, Canadian Jour., n. s., 3, 1868, p. 160.—Pahlen, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 24, No. 8, 1877, p. 7.—Zittel, Handb. Pal., 1, 1880, p. 676.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th ser., 1, 1884, p. 576.—Miller, N. A. Geol. Pal., 1889, p. 360.—Koken, Die Leitfossilien, Leipzig, 1896, p. 234, fig. 194, p. 408.—Huene, Verh. d. Russ.-Kais. Min. Gesell. zu St. Petersburg, 2d ser., 38, 1896, p. 224.

Clitambonites adscendens (?Pander).

Orthisina adscendens (Pander) Kayser, Paleontographica, Suppl., 3, 1876, p. 20, pl. 2, figs. 9-11.
Ordovician: Europe; Juan Pobre and Laja, Cordillera San Juan, Argentina.

CLITAMBONITES AMERICANUS Hall and Clarke. See *Clitambonites diversus*.

CLITAMBONITES AMERICANUS var. Hall and Clarke. See *Clitambonites diversus altissimus*.

Clitambonites(?) borealis (Castelnau).

Terebratula borealis Castelnau, *Essai Syst. Sil. l'Amérique Septent.*, 1843, p. 40, pl. 14, fig. 14.

Terebratula turpis de Verneuil, *ibid.* 1843, p. 40, footnote.

Clitambonites(?) borealis Schuchert, *Bull. U. S. Geol. Surv.*, 87, 1897, p. 183.

"Magnesian limestone of Green Bay, Wisconsin."

Observation.—The figure is not satisfactory. The species seems to be related to *C. diversus* Shaler (Schuchert).

Clitambonites diversus (Shaler).

Orthisina diversa Shaler, *Bull. Mus. Comp. Zool.*, 1, 1865, p. 67.

Orthisina verneuili Billings (not Eichwald), *Cat. Sil. Foss. Anticosti*, 1866, pp. 43, 74.

Clitambonites diversa Winchell and Schuchert, *Geol. Minnesota*, 3, 1893, p. 378, pl. 30, figs. 11–17.—Whiteaves, *Pal. Foss.*, 3, pt. 3, *Geol. Surv. Canada*, 1897, p. 166.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 270, figs. 324e–g.

Orthisina (Clitambonites) diversa Huene, *Verh. d. Russ. Kais. Mineral Gesell. zu St. Petersburg*, 2d ser., 38, 1900, p. 225, fig. 2.

Hemipronites, americanus Whitfield, *Ann. Rep. Geol. Surv. Wisconsin*, 1877, p. 72; *Geol. Wisconsin*, 4, 1882, p. 243, pl. 10, figs. 15–17.

Streptorhynchus americanus Miller, *N. A. Geol. Pal.*, 1889, p. 378.

Clitambonites americanus Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, p. 239, pl. 15A, figs. 1–8.—Ruedemann, *Bull. New York State Mus.*, 162, 1912, p. 94, pl. 4, figs. 14–19.

Trenton and Richmond: Island of Anticosti (Charleton and Ellis Bay); Oshkosh, Wisconsin; Cannon Falls, etc., Minnesota; Ontario; Manitoba; Snake Hill, New York.

Observation.—Probably two species are included in the above citations, but the types of both *C. diversus* and *C. americanus* are from the Richmond.

Clitambonites diversus altissimus Winchell and Schuchert.

Clitambonites americanus var. *Hall and Clarke, Pal. New York*, 8, pt. 1, 1892, pl. 15A, figs. 7, 8.

Clitambonites diversa var. *altissima* Winchell and Schuchert, *Geol. Minnesota*, 3, 1893, p. 381, pl. 30, figs. 18, 19.

Trenton (Prosser): Near Cannon Falls, Minnesota.

CLITAMBONITES DIVERSUS-ROGERSSENSIS Foerste. See *Clitambonites rogersensis*.

CLITAMBONITES(?) JOHANNENSIS Schuchert. See *Eoorthis johannensis*.

Clitambonites multicostus (Hudson).

Syntrophia multicosta Hudson, *Bull. New York State Mus.*, 80, 1903, p. 285, pl. 5, figs. 8–15.

Clitambonites multicostus Raymond, *Ann. Carnegie Mus.*, 7, 1911, p. 247, fig. 23; pl. 36, figs. 10–14.

Chazy (Valcour): Eastern side of Valcour Island, Bluff Point, and Chazy, New York.

Clitambonites multistriatus Foerste.

Clitambonites multistriata Foerste, *Bull. Sci. Lab. Denison Univ.*, 17, 1912, p. 131, pl. 10, fig. 12.

Trenton (Perryville): Near Danville, Kentucky.

CLITAMBONITES PIGER Schuchert and Twenhofel. See *Orthis(?) piger*.

Clitambonites planus retroflexus (Verneuil).

Gonambonites plana var. *retroflexa* Verneuil, Beitr. zur Geog. Russ. Reiches, 1830, p. 77, pl. 25, figs. 1, 2.

Clitambonites (*Gonambonites*) *plana* var. *retroflexa* Matthew, Trans. Roy. Soc. Canada, 2d ser., 1, 1896, p. 266, pl. 2, figs. 1a-1c.

Canadian (Bretonian): McFeel, Cape Breton, Nova Scotia.

Clitambonites porcia (Billings).

Orthis porcia Billings, Canadian Nat. Geol., 4, 1859, p. 439, figs. 16-18; Geol. Canada, Geol. Surv. Canada, 1863, p. 130, fig. 58.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 531, figs.

Clitambonites porcia Raymond, Ann. Carnegie Mus., 7, 1911, p. 248, pl. 36, figs. 15, 16.

Chazy (Aylmer): Two miles south of Montreal, Quebec.

Clitambonites rogersensis (Foerste).

Clitambonites diversus-rogersensis Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 323, pl. 7, figs. 14a, b.

Clitambonites rogersensis Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 69; Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 132, pl. 2, figs. 6a-d.

Trenton (Upper): Rogers Gap and north of Ford, Kentucky.

CLONOGRAPTUS Nicholson. See *Clonograptus* Hall.**CLONOGRAPTUS** Hall.

Genotype: *Graptolithus rigidus* Hall.

Clonograptus Hall in Nicholson, Ann. Mag. Nat. Hist., 4th ser., 11, 1873, p. 138.

Clonograptus Zittel, Handb. Pal., 1, 1879, p. 299.—Herman, Geol. Mag., dec. 3, 3, 1886, p. 24.—Barrois, Ann. Soc. Geol. Nord, 21, 1893, p. 108.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, No. 4, 1896, p. 265.—Koken, Die Leitfossilien, 1896, p. 416.—Roemer and Frech, Leth. geog., 1 Theil Leth. Pal., 1, 2 Lief, 1897, p. 598.—Elles, Quart. Jour. Geol. Soc. London, 54, 1898, p. 472.—Elles and Wood, Mon. British Graptolites, Pal. Soc., 1902, p. 82.

Clonograptus abnormis (Hall).

Graptolithus abnormis Hall, Canadian Nat. Geol., 3, 1858, p. 144; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 117; Pal. New York, 3, 1859, p. 503; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 51; Geol. Surv., Canada, dec. 2, 1865, p. 106, pl. 11, fig. 6.

Graptolithus (*Monoprion*) *abnormis* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 226; rev. ed., 1870, pp. 223, 261.

Clonograptus abnormis Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. 51 (gen. ref.).

Dichograptus abnormis Gurley, Jour. Geol., 4, 1896, pp. 65, 95 (gen. ref.).

Canadian (Levis): Point Levis, Quebec.

Clonograptus flexilis (Hall).

Graptolithus flexilis Hall, Geol. Surv. Canada, Rep. for 1857, 1858, pp. 119, 145.—Billings, Geol. Canada, Geol. Surv. Canada, 1868, p. 228, fig. 235.—Hall, Geol. Surv. Canada, dec. 2, 1865, p. 11, fig. 8; p. 103, pl. 10, figs. 3-9.

Dichograptus flexilis Nicholson, Mon. British Graptolites, 1872, p. 108, fig. 51.—Gurley, Jour. Geol., 4, 1896, p. 95.

Graptolithus (*Dichograptus*) *flexilis* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 176, fig. 9; p. 226, pl. 3, figs. 28, 29; rev. ed., 1870, p. 209, fig. 9, pl. 3, figs. 28, 29.

Graptolithus (*Monoprion*) *flexilis* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 223.

Clonograptus flexilis—Continued.

Clonograptus flexilis Nicholson, Ann. Mag. Nat. Hist., 4th ser., 11, 1873, p. 138 (gen. ref.).

Clonograptus flexilis Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 97.—Pritchard, Proc. Royal Soc. Victoria, n. s., 7, 1895, p. 29.—Roemer, Leth. geog., 1 Theil., Leth. Pal., 1, 3 Lief., 1897, p. 599, fig. 164.—Elles, Quart. Jour. Geol. Soc. London, 54, 1898, p. 473.—T. S. Hall, Proc. Soc. Victoria, n. s., 11, 1898, p. 169, pl. 19, fig. 20.

Clonograptus cf. flexilis Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, p. 618.

Canadian: Point Levis, Quebec (*Levis*, *Clonograptus* zone); St. John, New Brunswick (Bretonian, Div. C 3d); near Defreestville, Rensselaer County, New York (Deepkill); Victoria.

Clonograptus milesi (Hall).

Graptolithus milesi Hall, Geol. Vermont, 1, 1861, p. 372; 2, pl. 12, figs. 2-4; Geol. Surv. Canada, dec. 2, 1865, p. 20, fig. 27; 20th Rep. New York State Cab. Nat. Hist., 1868, p. 188, fig. 29; p. 226; rev. ed., 1870, p. 217, fig. 29.

Graptolithus (Monoprion) *milesi* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 223.

Dichograptus (*Graptolithus*) *milesi* Nicholson, Mon. Brit. Grapt., 1872, p. 65, fig. 34.

Temnograptus milesi Nicholson, Geol. Mag., dec. 2, 3, 1876, p. 248 (gen. ref.).

Clonograptus milesi Ruedemann, Bull. New York State Mus., 69, 1903, p. 939;

Mem. New York State Mus., 7, 1904, p. 617 and footnote.

Canadian (*Levis*): Monckton, Vermont.

CLONOGRAPTUS PROXIMATUS Matthew. See *Staurograptus dichotomus*.

Clonograptus remotus (Gurley).

Dichograptus remotus Gurley, Jour. Geol., 4, 1896, p. 64.

Clonograptus remotus Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 133 (gen. ref.).

Canadian (*Levis*): Point Levis, Quebec.

CLONOGRAPTUS RICHARDSONI Elles and Wood. See *Holograptus richardsoni*.

Clonograptus rigidus (Hall).

Graptolithus rigidus Hall, Canadian Nat. Geol., 3, 1858, p. 146; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 121; Geol. Surv. Canada, dec. 2, 1865, p. 105, pl. 11, figs. 1-5.

Graptolithus (Monoprion) *rigidus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 226; rev. ed., 1870, pp. 223, 261.

Dichograptus rigidus Gurley, Jour. Geol., 4, 1896, p. 95 (gen. ref.).

Clonograptus rigidus Nicholson, Ann. Mag. Nat. Hist., 4th ser., 11, 1873, p. 138 (gen. ref.).—Roemer and Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 599.—T. S. Hall, Proc. Royal Soc. Victoria, n. s., 11, 1898, p. 170, pl. 18, fig. 22; pl. 19, fig. 21.—Elles and Wood, Mon. Brit. Grapt. Pal. Soc., 1903, p. 51 (gen. ref.).

Canadian (*Levis*, *Clonograptus* zone): Point Levis, Quebec. Lower Ordovician slates of Victoria.

Clonograptus ? spinosus Matthew.

Clonograptus (?) *spinosus* Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 97, pl. 7, figs. 2 a, b.

Canadian (Bretonian, Div. C 3b): Navy Island, New Brunswick.

Observation.—Possibly same as *Staurograptus dichotomus* Emmons.

CLORINDA Barrande.Genotype: *C. armata* Barrande.

Clorinda Barrande, Syst. Sil. Boheme, 5, pt. 1, 1879, p. 109, pl. 119; Brach. Ext. Syst. Sil. Centre Boheme, 5, 1879, p. 172.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 322.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 276.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 395.

Barrandella Hall and Clarke, Pal. New York, 8, pt. 2, 1893, pp. 241, 243; Ann. Rep. New York State Geol., 1895, p. 844.—Grabau, Bull. New York State Mus., 45, 1901, p. 191; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 191.

Clorinda arcuosa (McChesney).

Pentamerus arcuosus McChesney, Descriptions New Pal. Foss., 1861, p. 87.

Clorinda arcuosa Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 184

Niagaran (Racine): Milwaukee, Wisconsin.

Clorinda areyi (Hall and Clarke).

Barrandella areyi Hall and Clarke, Pal. New York, 8, pt. 2, 1893, pp. 242, 368, pl. 71, figs. 14-16; 48th Rep. New York State Mus. for 1895, 2, 1897, p. 369, pl. 13, figs. 1-3; 14th Rep. State Geol. New York for 1894, 1897, p. 369, pl. 13, figs. 1-3.

Clorinda areyi Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 184.

Clinton: Rochester, New York.

CLORINDA BARRANDEI Schuchert. See *Virgiana barrandei*.**Clorinda fornicata** (Hall).

Pentamerus fornicatus Hall, Pal. New York, 2, 1852, p. 81, pl. 24, fig. 7.

Pentamerus fornicatus var. Hall, Desc. n. sp. Fossils, Waldron, Indiana, 1879, p. 16; 11th Rep. State Geol. Indiana, 1882, p. 299, pl. 27, fig. 15; Trans. Albany Inst., 10, 1883, p. 72.—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 616, figs.

Barrandella fornicata Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 243, pl. 70, figs. 11-13.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 191, fig. 104; Bull. New York State Mus., 45, 1901, p. 191, fig. 104.

Clorinda fornicata Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 184.

Clorinda (*Barrandella*) *fornicata* Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 276, fig. 335.

Niagaran: Lockport, New York (Clinton-Irondequoit); Waldron, Indiana (Waldron); Wisconsin.

Clorinda? thebesensis Savage.

Clorinda? thebesensis Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 79, pl. 5, figs. 7, 8.

Upper Medinan (Edgewood): Near Thebes, Illinois; Louisiana; and near Clarksville, Pike County, Missouri (Noix oolite).

Clorinda ventricosa (Hall).

Pentamerus ventricosus Hall, Geol. Surv. Wisconsin, Rep. Prog., 1860, p. 2.—Whitfield, Geol. Wisconsin, 4, 1882, p. 291, pl. 17, figs. 11-13.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 192, fig.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Surv., 1889, p. 64, pl. 33, figs. 12-14.—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 619, 2 figs.

Pentamerus chicaoensis Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 94, pl. 2, fig. 11.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 392.

Pentamerus (*Pentamerella*?) *ventricosa* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 374, pl. 13, figs. 18-21.

Clorinda ventricosa—Continued.

Pentamerus (*Pentamerella*) *ventricosus* Hall and Whitfield, Pal. Ohio, 2, 1875, p. 138, pl. 7, figs. 7, 8.

Pentamerus (*Barrandella*) *ventricosus* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 65.

Barrandella ventricosa Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 243, pl. 71, figs. 4–10; pl. 84, fig. 46.

Clorinda (*Barrandella*) *ventricosa* Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 276, fig. 336a–b.

Clorinda ventricosa Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 185.

Niagaran: Waukesha, Wisconsin; Bridgeport, Illinois (Racine); Louisville, Kentucky; Ohio.

Plesiotype.—Cat. No. 51323 (Nettelroth).

CLOSTEROCRINUS Hall.

Genotype: *C. elongatus* Hall.

Closteroocrinus Hall, Pal. New York, 2, 1852, p. 179.—Pictet, *Traite de Pal.*, 2d ed., 4, 1857, p. 329.—Miller, N. A. Geol. Pal., 1889, p. 232.—Bather, *Treatise on Zool.* (Lankester), pt. 3, 1900, p. 173.

Closteroocrinus elongatus Hall.

Closteroocrinus elongatus Hall, Pal. New York, 2, 1852, p. 179, pl. A 41, figs. 2a–f. Clinton (Irondequoit): Lockport, New York.

CNEMIDIUM? *TRENTONENSIS* Worthen. See *Zittellella trentonensis*.

COCCOCCRINUS Müller.

Genotype: *C. rosaceus* Roemer.

Coccocrinus Müller, in Zeiler and Wirtgen, *Verh. Naturh. Verein Rheinl.*, 12, 1855, p. 20.—Pictet, *Traite de Pal.*, 2d ed., 4, 1857, p. 310.—Roemer, *Sil. Fauna West. Tennessee*, 1860, p. 51.—Dujardin and Hupé *Hist. Nat. Zooph.*, 1862, p. 107.—Allman, *Trans. Royal Soc. Edinburgh*, 23, 1864, p. 248, fig. 3.—Schultze, *Denk. d. Kais. Akad. der Wiss., Math.-Naturw.*, Cl. 26, Abth. 2, 1867, p. 200, fig. 16.—Zittel, *Handb. d. Pal.*, 1, 1879, p. 347.—Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1881, p. 232. (*Rev. Pal.*, pt. 2, p. 58); 1886, pp. 280, 336 (*Rev. Pal.*, pt. 3, pp. 58, 114); 1887, pp. 97–113; *ibid.*, 1890, pp. 351, 355.—Neumayr, *Stämme des Thierreicher*, 1889, p. 470.—Miller, N. A. Geol. Pal., 1889, p. 232.—Bather, *Geol. Mag.*, dec. 4, 4, 1897, p. 343.—Wachsmuth and Springer, *Mem. Mus. Comp. Zool.*, Harvard, 21, 1897, p. 733.—Bather, *Treatise on Zool.*, pt. 3, *Echinoderma*, 1900, p. 156.—Zittel, *Grundzüge Pal.*, 1, 1910, p. 149.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 515.—Springer, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 199.

Coccocrinus bacca Roemer.

Coccocrinus bacca Roemer, *Sil. Fauna West. Tennessee*, Breslau, 1860, p. 51, pl. 4, figs. 5a, 5b, 5c.—Miller, N. A. Geol. Pal., 1889, p. 232, fig. 265.—Wachsmuth and Springer, *Mem. Mus. Comp. Zool.*, Harvard, 21, 1897, p. 739, pl. 75, fig. 15.—Wood, *Bull. U. S. Nat. Mus.*, 64, 1909, p. 29, pl. 4, fig. 9.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 515, fig. 1835.

Platycrinites Ann Dixoni Troost, *Amer. Jour. Sci. and Arts*, 2d ser., 8, 1849, p. 420 (nom. nud.); *Proc. Amer. Assoc. Adv. Sci.*, 2, 1850, p. 61.

Niagaran (Brownspport): Perry and Decatur Counties, Tennessee.

Plesiotype.—Cat. No. 39888, U.S.N.M. (Troost's type of *P. Ann Dixoni*).

Coccocrinus conicus (Troost).

Coccocrinus conicus (*Cupellacrinites conicus* Troost MS. 1850) Wood, *Bull. U. S. Nat. Mus.*, 64, 1909, p. 29, pl. 15, fig. 1.

Niagaran (Brownspport): Decatur County, Tennessee.

Holotype.—Cat. No. 39933, U.S.N.M.

CODASTER OSGOODENSIS Wachsmuth and Springer. See *Stephanocrinus osgoodensis*.

CODASTER PENTALOBUS Hall. See *Stephanocrinus pentalobus*.

CODASTER PULCHELLUS Miller and Dyer. See *Stephanocrinus pulchellus*.

CODONOCILUS Whiteaves. Genotype: *C. striatum* Whiteaves.

Codonocheilus Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 17.

Codonochilus Miller, N. A. Geol. Pal., 1889, p. 400.

Codonochilus striatum Whiteaves.

Codonocheilus striatum Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 17, pl. 3, fig. 3.

Codonochilus striatum Fischer, Man. de Conchyl., 1885, pp. 832, 833.—Miller, N. A. Geol. Pal., 1889, p. 400, fig. 662.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 93.

Niagaran (Guelph): Heepeler and Durham, Ontario.

COELASTER AMERICANUS D'Orbigny. See *Petraster americana*.

COELASTER MATUTINA D'Orbigny. See *Hudsonaster matutina*.

COELIDIUM Clarke and Ruedemann. See *Cœlocaulus* Ehlert.

COELOCAULUS Ehlert. Genotype: *Murchisonia (Cœlocaulus) davidsoni* Ehlert. *Murchisonia* (part) Lindstrom, Billings, and other authors.

Cœlocaulus (new subgenus of *Murchisonia*) Ehlert, Bull. Soc. d'Etudes Sci. d'Angers, 7, 1888, p. 84.—Koken, Neues Jahrb. f. Min., Geol. Pal., 6, Beilage-Band, 1889, p. 371.—Donald, Quart. Jour. Geol. Soc. London, 48, 1892, p. 572; 51, 1895, p. 211.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pp. 959-1019.—Koken, Neues Jahrb. f. Min., Geol. Pal., 1, 1898, p. 20.

Cœlidium Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 65.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 652.

Cœlocaulus bivittatus (Hall).

Murchisonia bivittata Hall, Pal. New York, 2, 1852, p. 345, pl. 83, fig. 1a, b.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 339, fig. 343.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 70, pl. 3, figs. 7 (not fig. 8); Quart. Jour. Geol. Soc. London, 31, 1875, p. 546, pl. 26, fig. 7.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 427, fig.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 82, pl. 12, figs. 5, 6.

Murchisonia (Cœlocaulus) bivittata Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 462, pl. 13, fig. 4.

Cœlocaulus bivittatus Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1020 (gen. ref.).

Niagaran: Galt, Ontario (Guelph); Huntington, Indiana.

Pleniotype.—Cat. No. 52948, U.S.N.M.

Cœlocaulus estella (Billings).

Murchisonia Estella Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 157, fig. 139.—Koken, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 6, 1889, p. 368.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 11, 1895, p. 83.

Cœlocaulus estella Whiteaves, *ibid.*, 3, pt. 4, 1906, p. 334 (gen. ref.).

Niagaran (Guelph): Galt, Ontario.

Observation.—Probably the same as *C. turritiformis* (Hall).

Cœlocaulus linearis (Billings).

Murchisonia linearis, Billings, Canadian Nat. Geol., 4, 1859, p. 359, fig. 8g; Geol. Canada, Geol. Surv. Canada, 1863, p. 119, fig. 31.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 429, fig.

Cœlocaulus linearis—Continued.

Cœlocaulus linearis Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1020 (gen. ref.).

Cœlidium linearis Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 652.

Chazyan (Mingan): Mingan Islands, Canada.

Cœlocaulus LOGANI Hall. See *Cœlocaulus macrospira*.

Cœlocaulus longispira (Hall).

Murchisonia longispira Hall, Pal. New York, 2, 1852, p. 345, pl. 83, fig. 2a, b.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 70, pl. 3, figs. 11, 12; Quart. Jour. Geol. Soc. London, 31, 1875, p. 546, pl. 26, figs. 11, 12.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 83.

Cœlocaulus longispira Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1020 (gen. ref.).

Niagaran (Guelph): Galt, Ontario; Wisconsin.

Cœlocaulus macrospira (Hall).

Murchisonia macrospira Hall, Pal. New York, 2, 1852, p. 346, pl. 83, fig. 5.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 339, fig. 334.—Nicholson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 545, pl. 26, fig. 9; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 70, pl. 3, fig. 9.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 193, fig.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 27, pl. 4, figs. 7, 7a.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 429, fig.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 81.

Cœlidium macrospira Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 65, pl. 7, figs. 2–8; pl. 10, fig. 13.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 652, fig. 892.

Cœlocaulus macrospira Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 333 (gen. ref.).

Murchisonia loganii Hall, Pal. New York, 2, 1852, p. 346, pl. 84, figs. 4a, b.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 70, pl. 3, figs. 3, 4; Quart. Jour. Geol. Soc. London, 31, 1875, p. 544, pl. 26, figs. 3, 4.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 80.

Cœlocaulus logani Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1020 (gen. ref.).

Niagaran (Guelph): Galt, Ontario; Shelby and Rochester, New York; Wisconsin.

Cœlocaulus neglectus Ulrich and Scofield.

Cœlocaulus neglectus Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1020, pl. 82, figs. 29–31.

Trenton (Prosser): Near Cannon Falls, Minnesota.

Holotype.—Cat. No. 45749, U.S.N.M.

Cœlocaulus obtusus (Hall).

Murchisonia? obtusa Hall, Pal. New York, 2, 1852, p. 333, pl. 76, fig. 3.

Cayugan (Cobleskill): Schoharie, New York.

Cœlocaulus cœhlerti Ulrich and Scofield.

Cœlocaulus cœhlerti Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1020, pl. 70, figs. 61–63.

Cœlidium cœhlerti Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 652, fig. 893 a, b.

Murchisonia cœhlerti Miller, N. A. Geol. Pal., 2d App., 1897, p. 768 (gen. ref.).

Trenton (Galena): Jo Daviess County, Illinois.

Cotypes: Cat. No. 45750, U.S.N.M.

***Cœlocaulus petilla* (Hall and Whitfield).**

Murchisonia petilla Hall and Whitfield, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 186; 27th Rep., 1875, p. 186, pl. 13, fig. 8.—Nettelroth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 170, pl. 31, fig. 5.
Niagaran (Louisville): Falls of the Ohio.

***Cœlocaulus terebralis* (Hall).**

Murchisonia? terebralis Hall, Pal. New York, 2, 1852, p. 334, pl. 76, fig. 4.
Cayugan (Cobleskill): Schoharie, New York.

***Cœlocaulus turritiformis* (Hall).**

Murchisonia turritiformis Hall, Pal. New York, 2, 1852, p. 347, pl. 83, fig. 6a, b.—Nicholson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 545, pl. 26, fig. 10; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 70, pl. 3, fig. 10.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 26, pl. 4, fig. 5; pt. 2, 1895, p. 84, pl. 12, fig. 4.

Cœlocaulus turritiformis Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1020 (gen. ref.).

Niagaran (Guelph): Galt, Ontario; Wisconsin.

Observation.—See *C. estella* (Billings) for a probable synonym.

***Cœlocaulus vitellia* (Billings).**

Murchisonia Vitellia Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 156, fig. 138 (adv. sheets 1862).—Nicholson, Quart. Jour. Geol. Soc. London, 30, 1875, p. 547, pl. 26, fig. 6; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 71, pl. 3, fig. 6.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 80.

Cœlidium cf. *vitellia* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 67, pl. 7, figs. 9, 10.

Cœlocaulus(?) Vitellia Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 333 (gen. ref.).

Niagaran (Guelph): Galt, Ontario; Rochester, New York.

***Cœloclema* Ulrich.**

Genotype: *Diamesopora vaupeli* Ulrich.

Cœloclema Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 137; 7, 1884, p. 49 (not defined).—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, pp. 24, 211.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 21.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 122.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 742.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 83; Zittel-Eastman Textb. Pal., 1913, p. 328.

Diamesopora (part) Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 380, 467; Geol. Minnesota, 3, 1893, p. 330; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 268.

***Cœloclema alternatum* (James).**

Ceramopora alternata James, Paleontologist, No. 1, 1878, p. 5.

Monticulipora (*Fistulipora*) *alternata* James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 34, pl. 1, figs. 5–5b.

Diamesopora vaupeli Ulrich, Geol. Surv. Illinois, 8, 1890, p. 468, pl. 39, figs. 3, 3b; pl. 41, figs. 4–4c.

Cœloclema alternatum Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 211.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 33.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 803, pl. 12, figs. 2–2d; pl. 27, fig. 16.

Eden (Southgate and McMicken): Cincinnati, Ohio, and vicinity.

Plesiotypes.—Cat. No. 43292, U.S.N.M. (cotypes of *D. vaupeli*).

***Cœloclema cavernosum* Bassler.**

Cœloclema cavernosa Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 21, pl. 23, figs. 10-13.

Clinton: Lockport, New York (Rochester); Osgood, Indiana (Osgood).

Cotypes.—Cat. No. 35471, U.S.N.M.

***Cœloclema commune* (Ulrich).**

Diamesopora communis Ulrich, Geol. Surv. Illinois, 8, 1890, p. 469, pl. 39, 3a, pl. 41, figs. 5, 5b.

Cœloclema concentricum Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 212 (not *Ceramopora concentrica* James).

Cœloclema commune Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 804, pl. 12, figs. 3, 3c; pl. 27, fig. 17.

Eden (Economy-McMicken): Cincinnati, Ohio, and vicinity.

Cotypes.—Cat. No. 43293, U.S.N.M.

CœLOCLEMA CONCENTRICUM Nickles and Bassler. See *Cœloclema commune*.

CœLOCLEMA IMBRICATA Ulrich. See *Diamesopora subimbricata*.

CœLOCLEMA INFREQUENS Ulrich. See *Diamesopora infrequens*.

CœLOCLEMA OSCULUM Ulrich. See *Diamesopora osculum*.

***Cœloclema oweni* (James).**

Fistulipora oweni James, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 21, figs. 2-2g.

Monticulipora (*Fistulipora*) *oweni* James and James, *ibid.*, 11, 1888, p. 34.—J. F. James, *ibid.*, 18, 1896, p. 119.

Diamesopora oweni Ulrich, Geol. Surv. Illinois, 8, 1890, p. 467.

Cœloclema oweni Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 212 (gen. ref.).—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 34, pl. 6, figs. 5, 6.

Maysville (Mount Auburn): Lebanon, Cincinnati, etc., Ohio; Indiana; Kentucky.

***Cœloclema trentonense* (Ulrich).**

Diamesopora trentonensis Ulrich, Geol. Minnesota, 3, 1893, p. 330, pl. 28, fig. 14; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 268, fig. 439.

Cœloclema trentonense Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 212 (gen. ref.).—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 122, fig. 178.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 328, fig. 463.

Black River (Decorah): St. Paul and Cannon Falls, Minnesota.

Trenton: St. Paul, etc., Minnesota (Prosser); Trenton Falls, New York; Ottawa, Ontario.

Cotypes.—Cat. No. 43294, U.S.N.M.

***CœLOCYSTIS* Schuchert.**

Genotype: *Hemicosmites subglobosus* Hall.

Hemicosmites Hall (not Von Buch), 20th Rep. New York State Cab. Nat. Hist., rev. ed., 1868, p. 359.

Sphærocystites Jaekel (not Hall), Stammesg. Pemat., 1, 1899, p. 289, fig. 63; p. 307.

Cœlocystis Schuchert, Amer. Geol., 32, 1903, p. 234; Smiths. Misc. Coll., 47, 1904, p. 246.

***Cœlocystis subglobosus* (Hall).**

Hemicosmites subglobosus Hall, 25th Rep. New York State Cab. Nat. Hist., 1868, (extras Dec., 1864), p. 316, pl. 12 (3), fig. 13; rev. ed., 1868 (1870), p. 359, pl. 12, fig. 13.

Coelocystis subglobosus—Continued.

Sphaerocystites dolomiticus Jaekel, *Stammesg. Pelmat.*, 1, Thecoidea u. Cystoidea, 1899, p. 289, fig. 63.

Coelocystis subglobosus Schuchert, *Amer. Geol.*, 32, 1903, p. 235; *Smiths. Misc. Coll.*, 47, 1904, p. 248, figs. 36, 37.

Niagaran (Racine): Racine, Wisconsin; Chicago, Illinois.

Plesiotypes.—Cat. Nos. 35061, 35155, U.S.N.M.

COELOSPIRA Hall.

Genotype: *Leptocœlia concava* Hall.

Coelospira Hall, 16th Rep. New York State Cab. Nat. Hist., 1863, p. 59; *Trans.*

Albany Inst., 4, 1863, p. 146; *Pal. New York*, 4, 1867, p. 328.—Hall and

Clarke, *Pal. New York*, 8, pt. 2, 1893, p. 134, figs. 122, 123.—Davidson, *Mon.*

British Foss. Brach., 5, *Sil. Suppl.*, *Pal. Soc.*, 1882, p. 84.—Miller, N. A.

Geol. Pal., 1889, p. 340.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 241.—

Schuchert, *Zittel-Eastman Textb. Pal.*, 1, 1900, p. 338; 2d ed., 1913, p. 338.

Leptocœlia Hall, 10th Rep. New York State Cab. Nat. Hist., 1857, p. 108; 12th

Rep., 1859, p. 32, figs. 1, 2, 4; *Pal. New York*, 3, 1859, p. 447.—Billings,

Canadian Jour., 6, 1861, p. 351.—Hall, *Amer. Jour. Sci.*, 36, 1863, p. 14.—

Rominger, *Amer. Jour. Sci.*, 35, 1863, p. 84.—Hall, *Trans. Albany Inst.*, 4,

1863, p. 145; *Pal. New York*, 4, 1867, p. 365.—Davidson, *Mon. British*

Sil. Brach., *Pal. Soc.*, 1867, p. 138, footnote.—Dall, *Amer. Jour. Conch.*, 6,

1870, p. 98, footnote; 7, 1871, p. 60.—Zittel, *Handb. Pal.*, 1, 1880, p. 704.—

Davidson, *Mon. British Foss. Brach.*, 5, App. to *Suppl.*, *Pal. Soc.*, 1884, p.

365.—Miller, N. A. *Geol. Pal.*, 1889, p. 348.—Nettelroth, *Kentucky Fossil*

Shells, *Mem. Geol. Surv. Kentucky*, 1889, p. 151.—Hall and Clarke, *Pal.*

New York, 8, pt. 2, 1893, p. 136.—Ulrich, *Neues Jahrb. f. Min., Geol., Pal.*

Beilage-Band, 8, 1893, p. 60.—Koken, *Die Leitfossilien*, Leipzig, 1896, p.

249.—Schuchert, *Zittel-Eastman Textb. Pal.*, 1913, p. 417. (Subgenus of

Coelospira; genotype *L. flabellites* Hall.)

Anoplothea Grabau, *Bull. New York State Mus.*, 45, 1901, p. 205; *Bull. Buffalo*

Soc. Nat. Sci., 7, 1901, p. 205.—Schuchert and Maynard, *Maryland Geol.*

Surv., *Low. Dev.*, 1913, p. 433.

Coelospira concava tonolowayensis (Swartz).

Anoplothea concava var. *tonolowayensis* Swartz, *Maryland Geol. Surv.*, *Low.*

Dev., 1913, p. 435, pl. 73, figs. 20, 21.

Helderbergian (Keyser): Tonoloway, Maryland.

Coelospira congregata (Kindle and Breger).

Anoplothea congregata Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res.

Indiana, 1904, p. 444, pl. 9, figs. 18–20.—Foerste, *Cincinnati Soc. Nat. Hist.*,

Jour., 21, No. 1, 1909, p. 20.

Cayugan (Kokomo): Logansport and Kokomo, Indiana.

Coelospira hemispherica (Sowerby).

Atrypa hemispherica Sowerby, *Murchison's Sil. Syst.*, 1839, p. 639, pl. 20, fig. 7.—

Hall, *Pal. New York*, 2, 1852, p. 74, pl. 23, fig. 10.—Billings, *Geol. Canada*,

1863, p. 318, fig. 337.

Atrypa hemispherica ? Hall, *Geol. New York*; Rep. Fourth Dist., 1843, p. 73,

fig. 4.

Leptocœlia hemispherica Hall, 12th Rep. New York State Cab. Nat. Hist., 1859,

p. 77.—Nettelroth, *Kentucky Fossil Shells*, *Mem. Geol. Surv. Kentucky*,

1889, p. 152, pl. 32, figs. 21–23, 36–39.—Foerste, *Proc. Boston Soc. Nat. Hist.*,

24, 1890, p. 325, pl. 6, figs. 18, 19.

Atrypa flabella Shaler, *Bull. Mus. Comp. Zool.*, 4, 1865, p. 68.

Cœlospira hemispherica—Continued.

Cœlospira? *hemispherica* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 136, pl. 82, figs. 1-4 (? pl. 52, fig. 16).

Anoplothea hemispherica Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 145.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 204, fig. 132; Bull. New York State Mus., 45, 1901, p. 205, fig. 132.

Anoplothea (*Cœlospira*) *hemispherica* Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 350, fig. 455.

Silurian: England; Rochester, Sodus, and Walcott, New York; Kentucky; Tennessee; Georgia; Alabama; Nova Scotia (Clinton); The Jumpers, etc., Anticosti (Anticostian, Gun River-Chicotte).

Plesiotype.—Cat. No. 51322, U.S.N.M.

Cœlospira planoconvexa (Hall).

Atrypa planoconvexa Hall, Pal. New York, 2, 1852, p. 75, pl. 23, fig. 11.—Billings, Geol. Canada, 1863, p. 318, fig. 336.

Leptocœlia planoconvexa Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 78.—Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 144.

Cœlospira? *planoconvexa* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 136, pl. 52, fig. 15; pl. 53, figs. 11-16.

Anoplothea planoconvexa Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 145. Silurian: Flamborough Head, etc., Ontario (Cataract); Island of Anticosti (Gun River).

Cœlospira plicatula (Hall).

Atrypa plicatula Hall, Geol. New York, Rep. 4th Dist., 1843, p. 71, fig. 4; Pal. New York, 2, 1852, p. 74, pl. 23, fig. 9.

Leptocœlia? *plicatula* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 78.

Rhynchonella plicata Miller, N. A. Geol. Pal., 1889, p. 369.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 898, fig.

Cœlospira? *plicatula* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 136, pl. 52, figs. 12-14; pl. 82, fig. 5.

Anoplothea plicatula Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 145.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 205, fig. 133; Bull. New York State Mus., 45, 1901, pp. 205, 206, fig. 133.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 350, fig. 456.

Clinton: Reynales Basin, etc., New York.

Cœlospira saffordi (Foerste).

Anoplothea (*Cœlospira*) *saffordi* Foerste, Jour. Geol., 11, 1903, p. 709.

Anoplothea saffordi Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 89, pl. 1, fig. 6.

Niagaran (Brownsport): Near Martins Mills, Bath Springs, etc., Tennessee.

CœNITES Eichwald.

Genotype: *C. juniperinus* Eichwald.

Cœnites Eichwald, Zool. Specialis, pt. 1, Vilnae, 1829, p. 179.—Edwards and Haime, Mon. Polyp. Foss. Terr. Pal. (Arch. Mus. d'Hist. Nat., 5), 1851, pp. 187, 301.—McCoy, British Pal. Rocks and Fossils, 1854, p. 21.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 444.—Milne-Edwards, Hist. Nat. Corall, 3, 1860, p. 308.—Duncan, Rep. 41st Meeting British Assoc. Adv. Sci., 1872, p. 130.—Salter, Cat. Camb. and Sil. Foss., 1873, p. 105.—Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 150.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 54.—Nicholson and Etheridge, Jour. Linn. Soc., Zool., 13, 1877, p. 361.—Nicholson, Tab. Corals Pal. Period, 1879, p. 130.—Zittel, Handb. Pal., 1, 1880, p. 619.—Roemer, Leth. Geog., pt. 1, Leth. Pal., 1883, p. 444.—

COENITES—Continued.

Miller, N. A. Geol. Pal., 1889, p. 179.—Sardeson, Neues Jahrb. f. Min., Geol. Pal. Beilage-Band, 10, 1896, pp. 252, 320.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 26.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 2, 1902, p. 255.

Limaria Steininger, Mem. Soc. Geol. France, 1, 1834, p. 339, pl. 20, figs. 6, 6a.—Dana, Wilkes U. S. Expl. Exped. 1838–1842, 7, Zoophytes, 1846, p. 702.—Hall, Pal. New York, 2, 1852, p. 142.—Rominger, Amer. Jour. Sci. Arts, 2d ser., 34, 1862, p. 390; Geol. Surv. Michigan, 3, pt. 2, 1876, p. 44.

Observation.—See *Dictyostroma* Nicholson for a probable synonym.

Coenites crassus (Rominger).

Limaria crassa Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 45, pl. 18, fig. 1.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 341, fig.

Coenites crassa Davis, Kentucky Foss. Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 4, fig. 6.

Cladopora crassa Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 30.

Niagaran: Point of Barques, Lake Michigan; Lake Temiscaming, Quebec; Louisville, Kentucky.

Coenites fruticosus (?Steininger) Hall.

Limaria fruticosa Steininger, Bull. Soc. Geol. France, 1, 1834, p. 339.—Hall, Pal. New York, 2, 1852, p. 143, pl. 39, figs. 5a, b.

Coenites fruticosus Miller, N. A. Geol. Pal., 1889, p. 179 (gen. ref.).

Silurian: England; Lockport, New York (Lockport).

Coenites juniperinus Eichwald.

Coenites juniperinus Eichwald, Zool. Spec., 1, 1829, p. 197.—Edwards and Haime, Polyp. Foss. Terr. Pal., 1851, p. 301; Mon. British Foss. Corals, Pal. Soc., 1854, p. 276, pl. 65, figs. 4, 4a.—Nicholson, Pal. Tab. Corals, 1879, p. 134, pl. 6, figs. 5, 5b.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 1899, p. 27.

Silurian: England; Thorold, Ontario (Niagaran-Lockport).

Coenites laminatus (Hall).

Limaria laminata Hall, Pal. New York, 2, 1852, p. 143, pl. 39, figs. 6a–d.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 45, pl. 18, fig. 2.

Coenites laminata Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 151.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 55, fig. 25d, e.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 4, fig. 5.

Niagaran: Lockport, New York (Lockport); Drummond Island, Lake Huron; Louisville, Kentucky (Louisville).

Coenites lunatus (Nicholson and Hinde).

Coenites lunata Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 151, fig. 2.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 55, fig. 25a–c.—Miller, N. A. Geol. Pal., 1889, p. 179, fig. 155.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 28.

Niagaran: Owen Sound, Ontario; North end of Lake Temiscaming, Quebec. Anticostian (Jupiter River): The Jumpers, Anticosti.

Coenites ramulosus (Hall).

Limaria ramulosa Hall, Pal. New York, 2, 1852, p. 142, pl. 39, figs. 4a–d.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 44.

Coenites ramulosa Miller, N. A. Geol. Pal., 1889, p. 179 (gen. ref.).

Niagaran (Lockport): Lockport, New York.

Cœnites verticillatus (Winchell and Marcy).

Cladopora verticillata Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 84.

Limaria verticillata Rominger, Geol. Surv. Mich., 3, pt. 2, 1876, p. 45 (gen. ref.).

Cœnites verticillata Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 46, figs. 1-4.

Niagaran: Chicago, Illinois (Racine); Louisville, Kentucky (Louisville); Tennessee (Brownsport).

CœNOGRAPTUS Hall. See *Nemagraptus* Emmons.

CœNOGRAPTUS (?**PLEUROGRAPTUS**? **PTEROGAPTUS**) **DIVERGENS** Hall. See *Amphigraptus divergens*.

CœNOGRAPTUS EXILIS Lapworth. See *Nemagraptus exilis*.

CœNOGRAPTUS GRACILIS Hall. See *Nemagraptus gracilis*.

CœNOGRAPTUS (**PLEUROGRAPTUS**) **LINEARIS** Roemer and Frech. See *Pleurograptus linearis*.

CœNOGRAPTUS SURCULARIS Hall. See *Nemagraptus gracilis surcularis*.

CœNOSTOMA Spencer. See *Cœnostroma* Winchell.

CœNOSTOMA BOTRYOIDEUM Spencer. See *Clathrodictyon striatellum*.

CœNOSTOMA CONSTELLATUM Spencer. See *Stromatopora constellata*.

CœNOSTROMA CONSTELLATUM of authors. See *Stromatopora constellata*.

CœNOSTROMA GALTENSE Dawson. See *Stromatopora galtensis*.

COLEOLUS Hall.

Genotype: *C. tenuicinctus* Hall.

Coleolus Hall, Pal. New York, 5, pt. 2, 1879, p. 184.—Zittel, Handb. Pal., 2, 1882, p. 315.—Miller, N. A. Geol. Pal., 1889, p. 389.—Whidborne, Mon. Dev. Fauna South England, 3, Pal. Soc., 1896, p. 38.—Koken, Die Leitfossilien, Leipzig, 1896, p. 96.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 283.

Coleolus clintonensis Foerste.

Coleolus Clintonensis Foerste, Geol. Surv. Ohio, 7, 1893, p. 547, pl. 37A, fig. 11.
Upper Medinan (Brassfield): Soldiers' Home, near Dayton, Ohio.

Coleolus iowensis James.

Coleolus iowensis James, Amer. Geol., 5, 1890, p. 355.
Richmond (Maquoketa): Illinois and Iowa.

Coleolus spinulus Hall.

Coleolus spinulus Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 322, pl. 33, fig. 8; Trans. Albany Inst., 10, 1883, p. 74.
Niagaran (Waldron): Waldron, Indiana.

COLEOPRION Sandberger.

Genotype: *C. gracilis* Sandberger.

Coleoprion Sandberger, Neues Jahrb. f. Min., etc., 1847, p. 24.—Woodward, Man. Mollusca, pt. 2, 1854, p. 206.—Pictet, Traité de Pal., 2d ed., 3, 1855, p. 320.—Ludwig, Paleontographica, 11, 1864, p. 317.—Barrande, Syst. Sil. Centre Boheme, 3, 1867, p. 108.—Hall, Pal. New York, 5, pt. 2, 1879, p. 183.—Zittel, Handb. Pal., 1882, p. 315.—Miller, N. A. Geol. Pal., 1889, p. 390.—Koken, Die Leitfossilien, Leipzig, 1896, p. 96.

***Coleoprion minuta* Walcott.**

Coleoprion minuta Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 85, pl. 11, figs. 17, 17a; pl. 12, fig. 21.

Upper Pogonip: Lone Mountain and Pogonip Ridge, Nevada.

Cotypes.—Cat. No. 17373, U.S.N.M.

COLPOCERAS Hall. See *Endoceras* Hall.

***Colpomya* Ulrich.**

Genotype: *C. constricta* Ulrich.

Colpomya Ulrich, Geol. Surv. Ohio, 7, 1893, p. 659; Geol. Minnesota, 3, pt. 2, 1894, p. 522.—Miller, N. A. Geol., Pal., 2d App., 1897, p. 780.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 516.

***Colpomya abrupta* Savage.**

Colpomya abrupta Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 94, pl. 5, fig. 27. Upper Medinan (Edgewood): Near Edgewood, Missouri.

***Colpomya constricta* Ulrich.**

Colpomya constricta Ulrich, Geol. Surv. Ohio, 7, 1893, p. 659, pl. 52, figs. 17–19; Geol. Minnesota, 3, pt. 2, 1894, p. 523, fig. 41.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 516, figs. 695a, b.

Trenton (Perryville): Frankfort, Kentucky.

Cotypes.—Cat. No. 46120, U.S.N.M.

***Colpomya demissa* Ulrich.**

Colpomya demissa Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 524, pl. 36, figs. 21, 22. Black River (Decorah): Chatfield, Minnesota.

Holotype.—Cat. No. 46121, U.S.N.M.

***Colpomya faba* (Emmons).**

Nuculites faba Emmons, Nat. Hist. New York, Geol., 2, 1842, p. 385, fig. 5.

Lyonsia faba Conrad in Emmons, Amer. Geology, 1, pt. 2, 1855, p. 172, pl. 14, figs. 14, 15.

Modiolopsis faba Hall, Pal. New York, 1, 1847, p. 158, pl. 35, figs. 6a–d.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 408, fig.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 169, pl. 11, figs. 13–15.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 511.

Trenton: Watertown, etc., Middleville, New York; New Jersey; etc.

***Colpomya faba pusilla* Foerste.**

Modiolopsis faba Hall, Pal. New York, 1; 1847, pl. 82, figs. 4a–b.

Colpomya faba pusilla Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 275, pl. 2, fig. 10; pl. 3, figs. 4a, b.

Gincinnatian (Pulaaki): Pulaaki, New York; Chambly, Quebec.

***COLUMNARIA* Goldfuss.**

Genotype: *C. alveolata* Goldfuss.

Columnaria Goldfuss, Petrefacta Germaniæ, 1, 1826, p. 72.—Eaton, Geol. Textb., 2d ed., 1832, p. 40.—Steininger, Mem. Soc. Geol. France, 1, 1834, p. 343.—Koninck, Desc. Animaux Fossiles, Liege, 1842–1844, p. 25.—Dana, Amer. Jour. Sci. Arts, 2d ser., 1, 1846, p. 188; Wilkes U. S. Expl. Exped., 1838–1842, 7. Zoophytes, 1846, p. 362, pl. 26, figs. 9, 9a, 9b, 10.—McCoy, Ann. Mag. Nat. Hist., 2d ser., 3, 1849, p. 121.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 25.—Edwards and Haime, Mon. Polyp. Foss. Terr. Pal., 1851 (Arch. Mus. Hist. Nat., 5), pp. 159, 308.—McCoy, Cont. British Pal., 1854, p. 90; British Pal., Rocks and Foss., 1854, p. 92.—Billings, Candian Nat. Geol., 1, 1856, p. 124; 3, 1858, p. 420; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 166; Pictet,

COLUMNARIA—Continued.

- Traite Pal., 2d ed., 4, 1857, p. 448.—Milne-Edwards, Hist. Nat. Corall., 3, 1860, p. 317.—Goldfuss, Petrefacta, 2d ed., pt. 1, 1862, p. 67.—Ludwig, Paleontographica, 10, 1862, p. 191.—Verrill, Amer. Jour. Sci., 3d ser., 3, 1872, p. 191.—Duncan, Rep. 41st Meeting British Assoc. Adv. Sci., 1872, p. 132.—Verrill, Ann. Mag. Nat. Hist., 4th ser., 9, 1872, p. 360.—Nicholson, Rep. 44th Meeting British Assoc. Adv. Sci., Notes and Abstracts, 1875, p. 89.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 89.—Nicholson, Tab. Corals Pal. Period, 1879, p. 191.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 463.—Miller, N. A. Geol. Pal., 1889, p. 179.—Frech, Paleontographica, 37, 1890, p. 84.—Sherzer, Amer. Geol., 7, 1891, pp. 278–283.—James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 3, 1892, p. 97.—Weissermel, Zeits. d. d. geol. Gesell., 49, 1897, pp. 866, 868, 880.—Zittel-Eastman Textb. Pal. 1., 1900, p. 79.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 97.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 71.—Cummings, 32d Ann. Rep. Geol. Nat. Res. Indiana, 1908, p. 699.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 87.
- Favistella Dana, Wilkes U. S. Expl. Exped., 1838–1842, 7, Zoophytes, 1846, p. 538.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 24.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 229.—Hall, Pal. New York, 1, 1847, p. 275; *ibid.*, 2, 1852, p. 120.—Nicholson, Geol. Surv. Ohio, Pal., 2, 1875, p. 184; Rep. 44th Meeting British Assoc. Adv. Sci., Notes and Abstracts, 1875, p. 89; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 21; Trans. Royal. Soc. Edinburgh, 27, 1876, p. 249 (obiter); Tab. Corals Pal. Period, 1879, p. 192.—Zittel, Handb. Pal., 1, 1879, p. 230.—Miller, N. A. Geol. Pal., 1889, p. 188. (Genotype: *F. stellata* Hall.)
- Palæophyllum Billings, Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 168; Canadian Nat. Geol., 3, 1858, p. 422.—Nicholson, Geol. Surv. Ohio, Pal., 2, 1875, p. 219.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1878, pp. 68, 69.—Zittel, Handb. Pal., 1, 1879, p. 228.—Miller, N. A. Geol. Pal., 1889, p. 198.—Sherzer, Amer. Geol., 7, 1891, pp. 284–289.—James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 4, 1893, p. 146.—Lambe, Ottawa Naturalist, 12, 1899, p. 217. (Genotype: *Palæophyllum rugosum* Billings.)

COLUMNARIA ALVEOLARIS Hitchcock. See *Columnaria alveolata*.

Columnaria alveolata Goldfuss.

- Columnaria alveolata* Goldfuss, Petrefacta Germaniæ, 1, 1826, p. 72, pl. 24, figs. 7a–c; 2d ed., pt. 1, 1862, p. 68.—Edwards and Haime (part), Mon. Polyp. Foss. Terr. Pal. (Arch. Mus. Hist. Nat., 5), 1851, p. 309.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 229, pl. 4, fig. 10; Man. Geol., 1860, p. 94, fig. 80.—Milne-Edwards, Hist. Nat. Corall., 3, 1860, p. 317.—Chapman, Canadian Jour., n. s., 6, 1861, p. 510, fig. 78; 8, 1863, p. 197, fig. 168; Expos. Min. Geol. Canada, 1864, p. 104, fig. 78; p. 169, fig. 168.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 1, fig. 7.—Nicholson, Tab. Corals Pal. Period, 1879, p. 195, pl. 10, figs. 1, 1a.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 464, fig. 113.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 153, fig.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 6, fig. 3; pl. 7, fig. 2.—Miller, N. A. Geol. Pal., 1889, p. 180, fig. 157.—James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 3, 1892, p. 98.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 151.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, p. 98, pl. 6, figs. 1, 1a.—Foerste, Amer. Geol., 31, 1903, p. 343.—Hayes and Ulrich, U. S. Geol. Surv., fol. 95, illus. sheet, 1903, fig. 25.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 71, fig. 110.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 703, pl. 1, figs. 4, 4a.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 312, pl. 11, fig. 3.

Columnaria alveolata—Continued.

Columnaria sulcata Eaton, Geol. Textb., 2d ed., 1832, p. 4, pl. 5, fig. 51.—Clarke, 11th Rep. State Geol. New York, 1, 1894, p. 35; 45th Rep. New York State Mus. 1894, p. 351.

Columnaria multiradiata Castelnau, Essai Syst. Sil. Amer. Sept., 1843, p. 44, pl. 19, fig. 1.

Columnaria Blainvilli Billings, Canadian Nat. Geol., 3, 1858, p. 421; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 166.

Favistella stellata Hall, Pal. New York, 1, 1847, p. 275, pl. 75, figs. 1a-c.—Emons, Amer. Geology, 1, pt. 2, 1855, p. 229, fig. 81.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 206, fig. 202.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 22; Geol. Surv. Ohio, Pal. 2, 1875, p. 185.—White, Rep. U. S. Geogr. Surv. West 100th Merid., 4, 1877, p. 67, pl. 4, figs. 6a-c; 11th Ann. Rep. Indiana Dep. Geol., Nat. Hist., 1882, p. 378, pl. 44, figs. 1, 2.—Hall, 12th Rep., ibid., 1883, p. 247, pl. 1, figs. 2-4.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 236, figs.—Miller, N. A. Geol. Pal., 1889, p. 188, fig. 173.

Favistella alveolaris Dana, Wilkes U. S. Expl. Exped. 1838-1842, 7, Zoophytes, 1846, p. 538.

Columnaria stellata Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 91, pl. 28, fig. 1; pl. 34, fig. 3.—Davis, Kentucky Foss. Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 7, fig. 1.—Keyes, Missouri Geol. Surv., 4, 1894, p. 116, pl. 13, fig. 3.

Stones River-Richmond: An abundant and widespread fossil of the United States and Canada.

COLUMNARIA ALVEOLATA-CALYCINA Foerste. See *Columnaria calicina*.

Columnaria alveolata discreta Foerste.

Columnaria alveolata discreta Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 124.

Black River: Ottawa, Cloche Island, etc., Canada.

Columnaria alveolata interventa Foerste.

Columnaria alveolata interventa Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 122, pl. 4, figs. 1a-j.

Trenton (Cynthiana): Near Brannon, etc., central Kentucky.

Columnaria alveolata minima Foerste.

Columnaria alveolata minima Foerste Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 123.

Trenton (Cynthiana): Near New Forest, Kentucky.

Columnaria alveolata rigida (Billings).

Columnaria rigida Billings, Canadian Nat. Geol., 3, 1858, p. 421; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 167.

Richmond: Lake St. John, Canada.

COLUMNARIA BLAINVILLI Billings. See *Columnaria alveolata*.

Columnaria calicina (Nicholson).

Favistella (*Columnaria*) *calicina* Nicholson, Rep. 44th Meeting Brit. Assoc. Adv. Sci., Notes and Abstracts, 1874, p. 89.

Favistella calicina Nicholson, Rep. Prov. Ontario, pt. 2, 1875, p. 24, fig. 9.

Columnaria calicina Nicholson, Tab. Corals Pal. Period, 1879, p. 197, pl. 10, figs. 2, 2a; p. 198, fig. 28, 1a, b.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 464.—James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 3, 1892, p. 98.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 102, pl. 6, fig. 4.

Columnaria calicina—Continued.

Columnaria alveolata-calicina Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 313.

Columnaria herzeri Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 91.

Richmond: Cape Smyth, Lake Huron; Credit River at Streetsville, Ontario; east of White Cliff, Gamache Bay, Anticosti; Ohio; Kentucky; Indiana.

Columnaria carterensis Safford.

Columnaria carterensis Safford, Geol. Tennessee, 1869, p. 285.

Black River (Carters): Carters Creek, etc., central Tennessee.

Columnaria divergens Troost.

Not recognized.

Columnaria divergens Troost, 5th Geol. Rep. Tennessee, 1840, p. 73.

Mountain limestone: Near Nashville, Tennessee.

COLUMNARIA ERRATICA Billings. See *Columnaria* (*Palæophyllum*) *stokesi*.

COLUMNARIA GOLDFUSSI Billings. See *Lyopora goldfussi* and *Nyctopora billingii*.

Columnaria halli Nicholson.

Columnaria ——— Emmons, Geol. New York, Rep. 2d dist., 1842, p. 276, fig. 2.

Columnaria alveolata Hall, Pal. New York, 1, 1847, p. 47, pl. 12, figs. 1a-1c.—

Billings, Canadian Nat. Geol., 1, 1857, p. 124, figs. 9, 10.—Nicholson, Pal.

Prov. Ontario, 1863, pp. 8, 24, figs. 2, 9.—Billings, Geol. Canada, Geol. Surv.

Canada, 1863, p. 139, fig. 70.—Rominger, Foss. Corals Michigan, 1876, p. 89,

pl. 34, figs. 1, 2, 4.

Columnaria(?) *Halli* Nicholson, Tab. Corals Pal. Period, 1879, p. 200, fig. 28, 2;

p. 201, fig. 29, pl. 10, figs. 3, 3a.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883,

p. 465.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 85, pl. G,

figs. 14-16.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901,

p. 100, pl. 6, figs. 2, 2a.—Foerste, Amer. Geology, 31, 1903, pp. 343, 345.—

Hayes and Ulrich, U. S. Geol. Surv., folio 95, illust. sheet, 1903, fig. 47.—

Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 71.

Black River and Trenton: Canada; New York; Michigan; Kentucky; Tennessee;

Minnesota; Illinois; Iowa.

Plesiotype.—Cat. No. 35403, U.S.N.M. (Hayes and Ulrich).

Columnaria? helderbergiæ Swartz.

Columnaria? helderbergiæ Swartz, Maryland Geol. Surv., Low. Dev., p. 207, pl.

21, figs. 10, 11.

Helderbergian (Keyser): Warrior Mountain, Alleghany County, Maryland.

COLUMNARIA HERZERI ROMINGER. See *Columnaria calicina*.

COLUMNARIA INÆQUALIS Hall. See *Prismatophyllum inæquale*.

COLUMNARIA INCERTA Billings. See *Fletcheria incerta*.

Columnaria mamillaris Castelnau.

Not recognized.

Columnaria mamillaris Castelnau, Essai Synt. Sil. l'Amerique Septent., 1843, p. 45, pl. 19, fig. 3.

Silurian?: Shores of Lake Huron.

COLUMNARIA MULTIRADIATA Castelnau. See *Columnaria alveolata*.

COLUMNARIA PARVA Billings. See *Stylaræa parva*.

COLUMNARIA RIGIDA Billings. See *Columnaria alveolata rigida*.

COLUMNARIA RUGOSA Lambe. See *Columnaria* (*Palæophyllum*) *stokesi*.

COLUMNARIA STELLATA Rominger. See *Columnaria alveolata*.

Columnaria (Palaeophyllum) stokesi (Edwards and Haime).

Lithostrotion Stokesi Edwards and Haime, Mon. Polyp. Foss. Terr. Pal., 1851, p., 440, pl. 20, fig. 2.

Diphyphyllum Stokesi Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897 p. 152, pl. 17, figs. 5a, b.

Sarcinula? obsoleta Hall, Geol. Lake Sup. Land Dist., Foster and Whitney's Rep., 1851, p. 213, pl. 29, figs. 2, a, b.

Columnaria erratica Billings, Canadian Nat. Geol., 3, 1858, p. 421; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 167.

Palaeophyllum rugosum Billings, Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 168; Canadian Nat. Geol., 3, 1858, p. 422.

Columnaria rugosa Lambe, Ottawa Naturalist, 12, 1899, p. 217; Contr. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 101, pl. 6, figs. 3, 3a, b.

Richmond: Lake Winnipeg, Lake St. John, etc., Canada; Green Bay, Wisconsin.

COLUMNARIA SULCATA Eaton. See *Columnaria alveolata*.

Columnaria? sutherlandi Salter.

Columnaria Sutherlandi Salter, Sutherland's Jour. Voyage in Baffin's Bay, etc., 2, 1852, p. 231, pl. 6, fig. 8.

Silurian (?): Seal Island, Wellington Channel, Arctic America.

Columnaria (Palaeophyllum) thomi (Hall).

Columnaria thomi Hall, Rep. U. S. Mexican Bound. Surv., Emory, 1857, pl. 20, figs. 1a-d.

Cyathophylloides thomii Walcott, Pal. Univ., ser. 1, fas. 2, 1903, pl. 29.

Richmond: El Paso, Texas.

Holotype.—Cat. No. 9851, U.S.N.M.

Observation.—Probably the same as *Columnaria (Palaeophyllum) stokesi* (Edwards and Haime).

Columnaria troosti Castelnau.

Not recognized.

Columnaria Troosti Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 44, pl. 19, fig. 2.

Silurian(?): Kentucky.

Columnaria vacua Foerste.

Columnaria(?) halli James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 3, 1892, p. 99.

Columnaria vacua Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 313, pl. 11, fig. 2.

Richmond: Ohio, Indiana, Kentucky, etc.

Observation.—This name has been proposed for the Richmond form of *Columnaria* closely related to *C. halli* which is restricted to Mohawkian strata. Some of the references under *C. halli* doubtless refer in part to *C. vacua*.

COLUMNOPORA Nicholson. See *Calapœcia* Billings.

COLUMNOPORA RAYI Davis. See *Calapœcia cribiformis*.

COMAROCYSTIS Haeckel. See *Comarocystites* Billings.

COMAROCYSTITES Billings.

Genotype: *C. punctatus* Billings.

Comarocystites Billings, Canadian Jour., 2, 1854, pp. 268, 269; Geol. Surv.

Canada, Rep. Progr. for 1853-56, 1857, p. 288; Geol. Surv. Canada, dec. 3, 1858, p. 61.—Chapman, Expos. Min. Geol. Canada, 1864, p. 109.—Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 143; Geol. Surv.

COMAROCYSTITES—Continued.

Illinois, 3, 1868, p. 291.—Zittel, Handb. Pal., 1, 1879, p. 418.—Miller, N. A. Geol. Pal., 1889, p. 233.—Jaekel, Zeits. d. d. geol. Gesell. 52, 1900, p. 676.—Zittel, Grundzuge Pal., 1, p. 184.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 472.

Comarocystis Haekel, Amphorideen u. Cystoideen, 1896, p. 70, pl. 1, figs. 4-4C.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 55.

Comarocystites obconicus (Meek and Worthen).

Comarocystites Shumardi var. *obconicus* Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 144; Geol. Surv. Illinois, 3, 1868, p. 294, pl. 1, fig. 2a, b.

Comarocystites obconicus Miller, N. A. Geol. Pal., 1889, p. 234.—Keyes, Missouri Geol. Surv., 4, p. 132, pl. 18, fig. 1.

Black River (Kimmswick): Cape Girardeau, Missouri.

Comarocystites punctatus Billings.

Comarocystites punctatus Billings, Canadian Jour., 2, 1854, p. 270, figs. 1-3; Geol. Surv. Canada Rep. Progr. for 1853-56, 1857, p. 288; Geol. Surv. Canada, dec. 3, 1858, p. 61, pl. 5, figs. 1, 1b, 2, 2b; also footnote, pl. 5.—Grant, Trans. Ottawa Field Nat. Club, 1, 1880, p. 29, pl. 1, figs. 1-5.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 472.

Comarocystis punctata Haeckel, Amphorideen u. Cystoideen, 1896, p. 70, pl. 1, figs. 4-4c.

Trenton (Curdsville): Ottawa, Ontario.

Comarocystites shumardi Meek and Worthen.

Comarocystites Shumardi Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 143; Geol. Surv. Illinois, 3, 1868, p. 292, fig.; pl. 1, figs. 1a, b.—Miller, N. A. Geol. Pal., 1889, p. 233, fig. 270.—Keyes, Missouri Geol. Surv., 4, 1894, p. 132, pl. 18, fig. 2.—Jaekel, Zeits. d. d. geol. Gesell., 52, 1900, p. 676.

Black River (Kimmswick): Cape Girardeau, Missouri.

COMAROCYSTITES SHUMARDI var. **OBCONICUS** Meek and Worthen. See *Comarocystites obconicus*.

COMPSOCRINUS Miller.

Genotype: *Glyptocrinus harrisi* Miller.

Compsocrinus Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, pp. 219, 233.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1885, p. 180 (Rev. Pal., 3, p. 104).—Miller, N. A. Geol. Pal., 1889, p. 234.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 516.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 165, fig. 78, 4.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 194.

Compsocrinus harrisi (Miller).

Glyptocrinus harrisi Miller, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 74, pl. 1, figs. 4, 4a.

Compsocrinus harrisi Miller, *ibid.*, 6, 1883, p. 234, pl. 7, figs. 4, 4a; N. A. Geol. Pal., 1889, p. 234, figs. 271, 272.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 21, 1897, figs. 8a, b.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 165, fig. 78.

Mariacrinus Harrisi Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1885, pp. 311, 326 (Rev. Pal., pt. 3, p. 104).—James, Jour. Cincinnati Soc. Nat. Hist., 19, 1897, p. 118.

Richmond (Liberty): Waynesville, Ohio.

Holotype and *plesiotype*.—Cat. No. 40759, U.S.N.M.

Compeocrinus miamiensis (Miller).

Glyptocrinus miamiensis Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 34, pl. 1, fig. 1; 6, 1883, p. 224.—James, *ibid.*, 19, 1897, p. 115.

Compeocrinus miamiensis Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 21, 1897, p. 518, pl. 21, figs. 7a, b.

Richmond (Liberty): Waynesville, Ohio.

Holotype.—Cat. No. 40760, U.S.N.M.

CONASPIS OWENI Hall. See *Ptychoparia oweni*.

CONCHICOLITES Nicholson. See *Cornulites Schlotheim*.

CONCHIDIUM Linnaeus.

Genotype: *C. biloculare* Linnaeus.

Conchidium Linnaeus, Mus. Tessonianum, 1753, p. 90; Syst. Nat., XI, 2, 1760, p. 163.—Ehler, Fischer's Manuel de Conchyliologie, 1887, p. 1311.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 231; 13th Ann. Rep. New York State Geol., 1895, p. 842.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 321.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 273.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 394.

Helmintholitus Linnaeus, Sys. Nat., 4, 1766, p. 163.

Pentamerus Sowerby (not *Pentamera* Dumeril, 1806), Mineral Conchology, 1, 1813, p. 73.

Gypidia Dalman, Kongl. Svenaka Vet.-Akad. Handl., för 1827, 1828, pp. 93, 100.—Zittel, Handb. Pal., 1, 1880, p. 694.—Koken, Die Leitfossilien, Leipzig, 1896, p. 244, fig. 206.

Pentamerus Billings, Canadian Jour., 6, 1861, p. 269.—Hall, 20th Rep. New York State Geol., 1867, p. 163; Pal. New York, 4, 1867, pp. 369, 373.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 52.

Antirhynchonella Quenstedt, Petref. Deutschlands, Brach., 1871, p. 231.

Zdimir Barrande, Syst. Sil. Bohème, 6, 1881, p. 171.

Conchidium arcticum Hortedahl.

Conchidium arcticum Hortedahl 2d Arct. Exp. "Fram," 1898-1902, No. 32, 1914, p. 5, pl. 6, figs. 5-7.

Niagaran: Baadkap, North Devon, Arctic America.

Conchidium biloculare Linnaeus.

Conchidium biloculare Linnaeus, Syst. Nat., XI, 2, 1760, p. 163.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 233, pl. 6, figs. 11-14.—Schuchert, Bull. U. S. Geol. Surv. 87, 1897, p. 185.

Pentamerus conchidium Emerson, Geol. Frobisher Bay; Nourse's Narr. Hall's Arctic Exped., 1879, p. 578.—Salter, Sutherland's Jour. Voyage in Baffin's Bay, etc., 2, App., p. 225, 1852, pl. 5, figs. 9, 10.

Silurian: Europe; Rescue Harbor, Arctic America.

Conchidium colletti (Miller).

Pentamerus colletti Miller, 17th Rep. State Geol. Indiana, 1891, p. 77, pl. 13, figs. 5, 6 (ad. sheets, 1891, p. 77).

Conchidium colletti Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 235, pl. 66, figs. 16, 17.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 30.

Cayugan (Kokomo): Kokomo, Indiana.

Conchidium crassiplica Hall and Clarke.

Conchidium crassiplica Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pp. 235, 369, pl. 66, figs. 24, 25; 48th Rep. New York State Mus. for 1895, 2, 1897, p. 367, pl. 11, figs. 3, 4; 14th Rep. State Geol. New York for 1894, 1897, p. 367, pl. 11, figs. 3, 4.

Niagaran (Louisville): Near Louisville, Kentucky.

Conchidium crassiradiatum Schuchert. See *Conchidium crassoradius*.

***Conchidium crassoradius* (McChesney).**

Pentamerus crassoradius McChesney, Descr. New Pal. Foss., 1861, p. 87.

Conchidium crassiradiatum Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 185.

Niagaran (Racine): Milwaukee, Wisconsin.

***Conchidium decussatum* (Whiteaves).**

Pentamerus decussatus Whiteaves, Canadian Rec. Sci., 1891, p. 295, pl. 3, figs.

3, 4.—Calvin, Bull. Lab. Nat. Hist., State Univ. Iowa, 11, 1892, p. 164, pl.

11, figs. 1-3; pl. 12, fig. 2.

Conchidium decussatum Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 235,

pl. 65, figs. 1, 2; pl. 66, fig. 15.—Whiteaves, Geol. Surv. Canada, Pal. Foss.,

3, pt. 4, 1906, p. 293, pl. 26, figs. 1, 2.

Niagaran: Grand Rapids of the Saskatchewan, etc., Canada.

***Conchidium exponens* Hall and Clarke.**

Conchidium exponens Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 66.

figs. 6-9; 48th Rep. New York State Mus. for 1895, 2, 1897, p. 366, pl. 10,

figs. 20-23; 14th Rep. State Geol. New York for 1894, 1897, p. 366, pl. 10,

figs. 20-23.

Niagaran (Louisville): Louisville, Kentucky.

***Conchidium georgiæ* Hall and Clarke.**

Conchidium georgiæ Hall and Clarke, Pal. New York, 8, pt. 2, 1895, p. 369, pl.

66, figs. 18, 19; 48th Rep. New York State Mus. for 1895, 2, 1897, p. 367, pl.

11, figs. 10, 11; 14th Rep. State Geol. New York for 1894, 1899, p. 367, pl.

11, figs. 10, 11.

Clinton: Trenton, Georgia.

***Conchidium greenii* Hall and Clarke.**

Conchidium greenii Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pp. 235, 368,

pl. 66, figs. 20-22; 48th Rep. New York State Mus. for 1895, 2, 1897, p. 367,

pl. 11, figs. 5-7; 14th Rep. State Geol. New York for 1894, 1897, p. 367, pl.

11, figs. 5-7.

Niagaran (Racine): Near Milwaukee, Wisconsin.

***Conchidium knappi* (Hall and Whitfield).**

Pentamerus knappi Hall and Whitfield, 24th Rep. New York State Cab. Nat.

Hist., 1872, p. 184; 27th Rep., 1875, pl. 10, figs. 10-12.—Nettelroth Kentucky

Foss. Shells, Mem. Kentucky Geol. Surv., 1889, p. 55, pl. 28, figs. 1-4.

Conchidium knappi Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 235, pl.

64, figs. 11-13.

Niagaran (Louisville): Louisville, Kentucky; Tennessee.

Plenotype.—Cat. No. 51352, U.S.N.M.

***Conchidium laqueatum* (Conrad).**

Pentamerus laqueatus Conrad, Proc. Acad. Nat. Sci. Philadelphia, 7, 1855, p.

441.—Hall, 42d Rep. New York State Mus. Nat. Hist., 1889, p. 384 (foot-
note).

Pentamerus nobilis Emmons, Man. Geol., 1860, p. 107, fig.

Conchidium laqueatus Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 232,

fig. 168; p. 234, pl. 65, figs. 3-9.—Kindle and Breger, 28th Rep. Dep. Geol.

Nat. Res. Indiana, 1904, p. 434, pl. 3, figs. 1, 2; pl. 4, fig. 3; pl. 6.—Grabau

and Shimer, N. A. Index Fossils, 1, 1907, p. 274.

Niagaran: Delphi, Huntington, Georgetown, etc., Indiana.

Conchidium legoense Foerste.

Conchidium legoensis Foerste, Jour. Geol., 11, 1903, p. 711; Bull. Sci. Lab. Denison Univ., 14, 1909, p. 69, pl. 2, fig. 36A, B.

Niagaran (Brownsport): Short Creek, northeast of Lego, Tennessee.

Conchidium lindenense Foerste.

Conchidium lindenensis Foerste, Jour. Geol., 11, 1903, p. 711.—Bull. Sci. Lab. Denison Univ., 14, 1909, p. 69, pl. 2, fig. 35A, B.

Niagaran (Brownsport): Coon Creek, near Linden, Tennessee.

Conchidium littoni (Hall).

Pentamerus littoni Hall, Pal. New York, 3, 1859, p. 262.—Hall and Whitfield, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 186; 27th Rep., 1875, pl. 10, figs. 8, 9.—Nettelroth, Kentucky Foss. Shells, Mem. Kentucky Geol. Surv., 1889, p. 58, pl. 27, figs. 12, 13.

Conchidium littoni Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 64, figs. 9, 10.—Foerste, Jour. Geol., 11, 1903, p. 711 (loc. occ.).

Conchidium cf. *littoni* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 435, pl. 3, figs. 3-6; pl. 4, figs. 1, 2, 4; pl. 5, figs. 4, 5.

Niagaran: Hardin County, Tennessee (Brownsport); Louisville, Kentucky (Louisville); ?Georgetown, Indiana.

Conchidium multicostatum (Hall).

Pentamerus multicostatus Hall, Geol. Surv. Wisconsin, Rep. Progr., 1860, p. 1; 20th Rep. New York State Cab. Nat. Hist., 1867, p. 373, pl. 13, figs. 22-24.

Conchidium multicostatum Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 64, fig. 6; pl. 66, fig. 10.

Conchidium cf. *multicostatum* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 435, pl. 6, fig. 3.

Niagaran: Wauwatosa and Waukesha, Wisconsin (Racine and Guelph); Connors Mills, Hamilton County, Indiana (Noblesville).

Conchidium nettelrothi Hall and Clarke.

Pentamerus knightii Nettelroth (not Sowerby), Kentucky Fossil Shells, Mem. Geol. Surv. Kentucky, 1889, p. 57, pl. 29, figs. 1, 2, 17.

Conchidium nettelrothi Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 234.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 273, fig. 332.

Onondaga? (?Niagaran): Louisville, Kentucky.

Cotypes.—Cat. No. 51312, U.S.N.M.

Conchidium nysius (Hall and Whitfield).

Pentamerus nysius var. *crassicosta* Hall and Whitfield, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 184; 27th Rep., 1875, pl. 10, figs. 4-7.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Survey, 1889, p. 60, pl. 28, figs. 5-8.

Pentamerus nysius var. *tenuicostatus* Nettelroth, *ibid.*, 1889, p. 60.

Conchidium nysius Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 235, pl. 64, figs. 1, 8, 27.

Niagaran (Louisville): Louisville, Kentucky; Tennessee.

Conchidium obsoletum Hall and Clarke.

Conchidium obsoletum Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 67, figs. 8, 9; 48th Rep. New York State Mus. for 1895, 2, 1897, p. 366, pl. 11, figs. 1, 2; 14th Rep. State Geol. New York for 1894, 1897, p. 366, pl. 11, figs. 1, 2.

Niagaran (Guelph): Genoa, Ottawa County, Ohio.

Conchidium occidentale Hall.

Pentamerus occidentalis Hall, Pal. New York, 2, 1852, p. 341, pl. 79, figs. 1, 2.—Billings, Geol. Canada, 1863, p. 337, fig. 341.—Nicholson, Pal. Prov. Ontario, 1875, p. 67, fig. 35.—Whitfield, Geol. Wisconsin, 4, 1882, p. 314, pl. 17, fig. 10; pl. 23, figs. 1, 2.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 239.

Conchidium(?) occidentalis Hall and Clarke, *ibid.*, 1895, pl. 67, figs. 1-5.—Leeley, Geol. Surv. Pennsylvania., Rep. P 4, 1889, p. 618, fig.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 273, fig. 331.

Niagaran (Guelph): Gault and Guelph, Ontario; Point St. Vital, Lake Huron; Williamstown, Wisconsin.

Conchidium scoparium Hall and Clarke.

Conchidium scoparium Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 67, figs. 6, 7; 48th Rep. New York State Mus. for 1895, 2, 1897, p. 366, pl. 11, figs. 8, 9; 14th Rep. State Geol. New York for 1894, 1897, p. 366, pl. 11, figs. 8, 9.

Niagaran (Guelph): Durham, Ontario.

Conchidium tenuicostatum (Hall and Whitfield).

Pentamerus nysius var. *tenuicosta* Hall and Whitfield, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 184; 27th Rep., 1875, pl. 10, figs. 1-3.

Pentamerus complanatus Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Survey, 1889, p. 53, pl. 27, figs. 14-16.

Conchidium tenuicostatus Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 235, pl. 64, figs. 3-5.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 187.

Niagaran (Louisville): Louisville, Kentucky.

Plesiotypes.—Cat. No. 51353, U.S.N.M. (Nettelroth's types of *P. complanatus*).

Conchidium trilobatum Kindle and Breger.

Conchidium trilobatum Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 436, pl. 5, figs. 1-3.

Niagaran: Huntington, Indiana.

Cotypes.—Cat. No. 52933, U.S.N.M.

Conchidium unguiforme (Ulrich).

Gypidia unguiformis Ulrich, Contrib. Amer. Pal., 1886, p. 28, pl. 3, fig. 2.

Gypidula unguiformis Miller, N. A. Geol. Pal., 1889, p. 346.

Conchidium unguiformis Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 235, pl. 66, figs. 1-4.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 436, pl. 6, figs. 4, 5.

Niagaran: Louisville, Kentucky (Louisville); Carroll County, Indiana.

CONCHITA RHOMBOIDALIS Wilckens. See *Leptena rhomboidalis*.

CONCHOPELTIS Walcott.

Genotype: *C. alternata* Walcott.

Conchopeltis Walcott, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, p. 93; mus. ed., 1879, p. 93.—Miller, N. A. Geol. Pal., 1889, p. 400.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 823.—Berkey, Amer. Geol., 21, 1898, p. 278.

Conchopeltis alternata Walcott.

Conchopeltis alternata Walcott, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, p. 93; mus. ed., 1879, p. 93.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 823, fig. 2.

Trenton: Trenton Falls, New York.

CONCHOPELTIS COMPRESSA Miller. See *Scenella compressa*.

CONCHOPELTIS MINNESOTENSIS Walcott. See *Scenella superba*.

CONCHOPELTIS OBTUSA Sarsenon. See *Scenella obtusa*.

CONILITES Pusch. See *Actinoceras* Bronn.

CONILITES CAPRICORNULUS Troost. See *Cyrtoceras capricornulus*.

CONOCARDIUM Dekoninck. Genotype: *C. hibernicum* Dekoninck.

Conocardium Dekoninck, Desc. Animaux Fossiles, Suppl., Liege, 1851, p. 673.—McCoy, British Pal. Rocks and Foss., 1854, p. 516.—Woodward, Man. Mollusca, pt. 2, 1854, p. 292, pl. 19, fig. 5.—Pictet, Traité Pal., 2d ed., 3, 1855, p. 477.—Barrande, Syst. Sil. Centre Boheme, 6, 1881, p. 66; Acepheles: Ext. Syst. Sil. Centre Boheme, p. 103.—Zittel, Handb. Pal., 2, 1881, p. 100.—Dekoninck, Ann. Mus., Royal Hist. Nat. Belgique, 11, 1885, p. 99.—Hall, Pal. New York, 5, pt. 1, Lam. 2, 1885, p. 34.—Barrois, Mem. Soc. Geol. Nord, 3, Lille, 1889, p. 155; Mem. Soc. Agriculture et Arts de Lille, 4th ser., 17, 1889, p. 155.—Nettelroth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 202.—Miller, N. A. Geol. Pal., 1889, p. 472.—Whidborne, Mon. Dev. Fauna South England, 2, Pal. Soc., 1892, p. 18.—Koken, Die Leitfossilien, Leipzig, 1896, p. 210, fig. 176, 1-3.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 261.—Hind, Mon. Brit. Carb. Lam., 1, Pal. Soc., 1900, p. 449.

Conocardium antiquum (Owen).

Pleurohynchus antiqua Owen, Geol. Wisconsin, Iowa, and Minnesota, 1852, pl. 2, fig. 19.

Conocardium antiquum Billings, Geol. Surv. Canada, Pal. Foss., 1, 1865, p. 42 (adv. sheets, 1862) (gen. ref.).—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 187.

Richmond: Lower Fort Garry, Red River, Canada.

Holotype.—Cat. No. 17897, U.S.N.M.

Conocardium beecheri Raymond.

Conocardium beecheri Raymond, Amer. Jour. Sci., 20, 1905, p. 374.

Chazy: Sloop Island, east of Valcour Island and at Chazy, New York (Valcour); Mingan Islands, Canada (Mingan).

CONOCARDIUM BLUMENBACHII Billings. See *Euchasma blumenbachi*.

Conocardium elegantulum Billings.

Conocardium elegantulum, Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 53.

Anticostian (Jupiter River and Chicotte): Southwest Point, Anticosti.

Conocardium elrodi Miller.

Conocardium elrodi Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1892, p. 705, pl. 20, fig. 14 (adv. sheets, 1891, p. 95).

Niagan (Laurel): Hartsville, Indiana.

Conocardium immaturum Billings.

Conocardium immaturum Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 143, fig. 83a; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 41, text fig. 43 (adv. sheets, 1862).

Black River (Leray): Pauquettes Rapids, Ottawa River, Canada.

Conocardium monroicum Grabau.

Conocardium monroicum Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 171, pl. 16, figs. 1-3; pl. 20, figs. 14, 15; pl. 22, fig. 3.

Upper Monroan: Salt shaft at Detroit, Michigan (Anderdon); opposite Amherstburg, Ontario (Amherstburg); Wayne County, Michigan (Lucas).

Conocardium multistriatum Kindle and Breger.

Conocardium multistriatum Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 449, pl. 10, fig. 4.

Niagaran: Georgetown, Indiana.

Conocardium niagarense Winchell and Marcy.

Conocardium niagarense Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 97, pl. 2, fig. 14.

Niagaran (Racine): Chicago, Illinois.

Conocardium ornatum Winchell and Marcy.

Conocardium ornatum Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 111, pl. 2, fig. 15.

Niagaran (Racine): Chicago, Illinois.

Conocardium oweni Kindle and Breger.

Conocardium oweni Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 450, pl. 10, figs. 2, 3.

Niagaran (Noblesville): Little Deer Creek and Connors Mill, Hamilton County, Indiana.

Conocardium richmondense Foerste.

Conocardium richmondensis Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 71, pl. 2, fig. 21A, B.

Richmond (Elkhorn): Elkhorn Creek, three miles south of Richmond, Indiana.

Conocardium tegulum Hall.

Conocardium tegulum Hall, Pal. New York, 5, pt. 1, Lam. 2, 1885, p. 415, pl. 68, figs. 30, 31 (adv. sheets, 1883).

Niagaran: Locality not given.

CONOCEPHALE Edwards. See *Conocephalites* Zenker.

CONOCEPHALINA Gronwall. See *Conocephalina* Brögger.

CONOCEPHALITES Zenker.

Genotype: *Conocephalus costatus* Zenker.

Conocephalites Zenker, Beitr. z. Naturg. Umwelt., 1833, p. 48.—Barrande, Neues Jahrb. f. Min., etc., 1850, p. 779; Syst. Sil. Centre Boheme, 1, 1852, p. 415, pls. 13, 14, 29.—Pictet, Traite Pal., 2d ed. 2, 1854, p. 493.—Hall, 16th Ann. Rep. New York State Cab. Nat. Hist., 1863, pp. 147, 148.—Chapman, Canadian Jour., n. s., 8, 1863, p. 32, fig. 150; p. 192, fig. 161; Expos. Min. Geol. Canada, 1864, p. 140.—Hall, Trans. Albany Inst., 5, 1867, p. 129.—Billings, Canadian Nat., n. s., 6, 1872, p. 474; Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 72.—Meek, U. S. Geol. Expl. 40th Parl., 4, 1877, p. 22.—Woodward, Geol. Mag., dec. 3, 1, 1884, p. 343.—Walcott, Science, 3, 1884, p. 281.—Zittel, Handb. Pal., 2, 1855, p. 600.—Ehler, Bull. Soc. Geol. de France, 3d ser., 23, 1895, p. 319.—Wallerius, Unders. öfver. Zonen med. Agnostus lævigatus i Vestergotland, Lund, 1895, pp. 49, 50; Geol. Foren. Stockholm Forhandl. 18, 1896, p. 167.—Koken, Die Leitfossilien, Leipzig, 1896, p. 21.—Jaekel, Zeits. d. d. geol. Gesell., 53, 1901, p. 156.

Conocephale Edwards, Hist. Nat. Crustacees, 3, 1840, p. 335.

Conocephalus Burmeister, Org. der Tril., Berlin, 1843, p. 85.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, pp. 541, 556.—Emmrich, ibid., 1845, p. 43.—Burmeister, Org. Tril. London, 1846, p. 72.—Frech, Leth. geog., 1 Th., Leth. Pal., 2, 1897, p. 26, footnote.

CONOCEPHALITES CALCIFERUS Walcott. See *Lonchocephalus calciferus*.

Conocephalites(?) contiguus Matthew.

Conocephalites(?) contiguus Matthew, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 58, pl. 13, figs. 14a, b.

Canadian (Bretonian Div. C 3a): St. John, New Brunswick.

CONOCEPHALITES DEVINEI Matthew. See *Ptychoparia? devinei*.

CONOCEPHALITES HARTII Walcott. See *Dikelocephalus harti*.

CONOCEPHALITES HISINGERI Matthew. See *Lisania? hisingeri*.

CONOCEPHALITES MINUTUS Bradley. See *Ptychoparia minuta*.

CONOCEPHALITES OWENI Hall. See *Ptychoparia oweni*.

CONOCEPHALITES ZENKERI Billings. See *Ptychoparia zenkeri*.

CONOCEPHALUS Burmeister. See *Conocephalites Zenker*.

CONOCERAS ANGULOSUM Saemann. See *Actinoceras bigsbyi*.

CONOCORYPHE (PTYCHOPARIA) GALLATINENSIS Meek. See *Ptychoparia oweni*.

CONOKEPHALINA Brögger. Genotype: *Conocephalites ornatus* Brögger.

Conocephalina Brögger, Geol. Foren. i. Stockholm Forhandl., No. 101, 8, pt. 3, 1886, p. 206.—Walcott, Research in China, 3, Carnegie Inst., Washington, Publ. 54, 3, 1913, p. 137, pl. 13; Smiths. Misc. Coll., 57, 1914, p. 387.

Conocephalina Gronwall, Danmarks Geol. Unders. Raekke, 2, No. 13, 1902, p. 150.—Lorenz, Zeits. d. d. geol. Gesell., 58, pt. 2, 1906, p. 64.

Conocephalina? cristata (Billings).

Dikelocephalus cristatus Billings, Canadian Nat. Geol., 5, 1860, p. 312, fig. 10; Geol. Canada, Geol. Surv. Canada, 1863, p. 236, fig. 258; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 404, fig. 381.

Dicelloccephalus cristatus Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 11, footnote.

Conocephalina? cristata Walcott, Smiths. Misc. Coll., 57, 1914, p. 350 (gen. ref.). Ozarkian? (Levis-erratic): Point Levis, Quebec.

Conocephalina inexpectans (Walcott).

Dicelloccephalus inexpectans Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 90, pl. 1, fig. 10.—Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 11, footnote.

Dicelloccephalus inexpectatus Frech, Leth. geog., 1, Th., Leth. Pal., 2, 1897, p. 44, footnote.

Conocephalina inexpectans Walcott, Smiths. Misc. Coll., 57, 1914, p. 351 (gen. ref.). Lower Pogonip: Ridge east of Hamburg Ridge, Eureka district, Nevada.

Cotypes.—Cat. No. 24564, U.S.N.M.

Conocephalina megalops (Billings).

Dikelocephalus megalops Billings, Canadian Nat. Geol., 5, 1860, p. 311, fig. 9; Geol. Canada, Geol. Surv. Canada, 1863, p. 236, fig. 257; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 403, fig. 380.

Dicelloccephalus megalops Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 11, footnote.

Conocephalina megalops Walcott, Smiths. Misc. Coll., 57, 1914, p. 351 (gen. ref.). Ozarkian? (Levis-erratic): Point Levis, Quebec.

Conocephalina whitehallensis (Walcott).

Conocephalina whitehallensis Walcott, Smiths. Misc. Coll., 57, 1912, p. 269, pl. 44, figs. 9-11a.

Conocephalina whitehallensis—Continued.

Upper Cambrian or Ozarkian (Potsdam): Whitehall, Washington County, New York.

Holotype and *paratypes*.—Cat. Nos. 53579-53581, U.S.N.M.

CONOLICHAS Dames.

Genotype: *Lichas æquiloba* Steinhardt.

Conolichas Dames, Zeits. d. d. Geol. Gesell., 29, 1877, p. 806.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 33, 1885, pp. 30, 40, 87.—Zittel, Handb. Pal., 2, 1885, p. 624.—Hall and Clarke, Pal. New York, 7, 1888, p. xxxix, fig.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 754.—Koken, Die Leitfossilien, Leipzig, 1896, p. 30.—Gurich, Neues Jahrb. f. Min., Geol. Pal., 14, Beilage-Bd., 1901, p. 522, pl. 20, fig. 16.

Conolichas cornutus (Clarke).

Lichas (*Conolichas*) *cornutus* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 749, figs. 72, 73.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 237.

Trenton: Trenton Falls, New York; Lake Winnipeg, Canada.

CONOPHERYS *PUSILLA* Brögger. See *Shumardia pusilla*.

CONOPHYLLUM Hall. See *Cystiphyllum Lonsdale*.

CONOTRETA Walcott.

Genotype: *C. rusti* Walcott.

Conotreta Walcott, Proc. U. S. Nat. Mus., 12, 1890, p. 365 (extract 1889).—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 104, 167; 11th Ann. Rep. New York State Geol., 1894, p. 250.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 687.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 308; 2d ed., 1913, p. 376.—Matthew, Trans. Royal Soc. Canada, 2d ser., 7, sec. 4, 1901, p. 94.

Conotreta rusti Walcott.

Conotreta rusti Walcott, Proc. U. S. Nat. Mus., 12, 1890, p. 365, figs. 1-4 (extract 1889).—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 104, pl. 4K, figs. 16-21.

Trenton: Trenton Falls, New York; Covington, Kentucky.

Cotypes.—Cat. No. 18443, U.S.N.M.

CONOTUBULARIA Troost. See *Actinoceras Bronn*.

CONOTUBULARIA BRONGNIARTII Troost. See *Orthoceras brongniarti* Troost.

CONOTUBULARIA CUVIERII Troost. See *Actinoceras cuvieri*.

CONOTUBULARIA DEFRANCHII Troost. See *Orthoceras defranchi*.

CONOTUBULARIA GOLDFUSSI Troost. See *Orthoceras goldfussi*.

CONRADELLA Ulrich and Scofield. See *Phragmolites Conrad*.

CONRADIA Hall. See *Dinobolus* Hall.

CONSTELLARIA Dana.

Genotype: *Ceriopora constellata* (Van Cleve, MS.), Dana.

Constellaria Dana, Zoophyta, 1846, p. 537.—Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. Mus. d'Hist. Nat., 5), 1851, pp. 154, 278.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 154.—Nicholson, Pal. Ohio, 2, 1875, p. 214; Pal. Tab. Corals, 1879, p. 292.—Zittel, Handb. Pal., 1, 1880, p. 615; Genus *Monticulipora*, 1881, p. 97.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 156; 6, 1883, p. 265.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 475.—James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 29.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 374, 423.—Rominger, Amer. Geol.,

CONSTELLARIA—Continued.

6, 1890, p. 113.—Ulrich, *Geol. Minnesota*, 3, 1893, p. 311; Zittel's *Textb. Pal.* (Engl. ed.), 1896, p. 276.—J. F. James, *Jour. Cincinnati Soc. Nat. Hist.*, 18, 1896, p. 117.—Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 34.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 135.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 742.—Bassler, *Bull. U. S. Nat. Mus.*, 77, 1911, pp. 218, 219; Zittel-Eastman *Textb. Pal.*, 2d ed., 1913, p. 334. *Stellipora* Milne-Edwards, *Hist. Nat. des Corall.*, 3, 1860, p. 281 (in part).—Dybowski, *Die Chaeteten d. Ostbalt, Silur-Form.*, 1877, p. 42.

CONSTELLARIA ANTHELOIDEA Milne-Edwards. See *Constellaria florida*.

Constellaria constellata (Van Cleve) Dana.

Ceripora constellata Van Cleve (MS.) *Plates of Fossils*.

Constellaria constellata Dana, *Zoophyta*, 1846, p. 537, pl. 52, figs. 6, 6a.

Observation.—Van Cleve's illustrations could apply equally well to *C. florida* or *C. polystomella*. His specimens were said to be from the vicinity of Dayton, Ohio, and hence were probably of the latter species. In view of this uncertainty the name had better be dropped.

CONSTELLARIA CONSTELLATA-PLANA Nickles and Bassler. See *Constellaria florida plana*.

CONSTELLARIA CONSTELLATA PROMINENS Nickles and Bassler. See *Constellaria florida prominens*.

Constellaria emaciata (Ulrich and Bassler).

Constellaria florida var. *emaciata* Hayes and Ulrich, *U. S. Geol. Surv.*, folio 95, illustration sheet, 1903, fig. 30.—Ulrich and Bassler, *Smiths. Misc. Coll.*, 47, 1904, p. 37.

Constellaria emaciata Nickles, *Bull. Kentucky Geol. Surv.*, 5, 1905, p. 44, pl. 1, figs. 7, 8.—Foerste, *Jour. Cincinnati Soc. Nat. Hist.*, 21, 1914, p. 126.

Trenton: Columbia, Nashville, etc., Tennessee (Bigby and Catheys); Kentucky (Cynthiana).

Cotypes.—Cat. No. 43208, U.S.N.M.

Constellaria fischeri Ulrich.

Constellaria fischeri Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 6, 1883, p. 270, pl. 14, figs. 6-6c.—Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 214.

Trenton: Winchester, etc., Kentucky (Cynthiana); Nashville, etc., Tennessee (Catheys).

Holotype.—Cat. No. 44068, U.S.N.M.

Constellaria florida Ulrich.

Constellaria florida Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 257; 6, 1883, p. 267, pl. 14, figs. 2-2f; Zittel's *Textb. Pal.* (Engl. ed.), 1896, p. 276, fig. 461.—Nickles, *Bull. Kentucky Geol. Surv.*, 5, 1905, p. 54, pl. 3, fig. 5.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 136, fig. 188i.—Bassler, Zittel-Eastman *Textb. Pal.*, 1913, p. 334, fig. 484.

Monticulipora (*Constellaria*) *polystomella* (not Nicholson) James and James, (in part) *Jour. Cincinnati Soc. Nat. Hist.*, 11, 1883, p. 30; James, *ibid.*, 18, 1896, p. 118.

Chaetetes constellatus Quenstedt (not Van Cleve) *Röhren-und Sternkorallen*, 1881, p. 79, pl. 146, figs. 21-25.

Constellaria constellata Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 213.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 804, pl. 12, figs. 4-4e; pl. 27, fig. 19.

Constellaria florida—Continued.

Stellipora antheloidea D'Orbigny (not Hall), Prodr. de Pal., 1, 1850, p. 22.—Milne-Edwards, Hist. Nat. Corall., 3, 1860, p. 281.

Constellaria antheloidea Milne-Edwards and Haime, Pol. Foss. Terr. Pal., 1851, p. 279, pl. 20, figs. 7, 7b.—Nicholson, Pal. Ohio, 2, 1875, p. 214; Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 92, pl. 5, fig. 10.—James, Paleontologist, No. 2, 1878, p. 13.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 476, fig. 116.—Nicholson, Pal. Tab. Corals, 1879, p. 301, pl. 14, figs. 5, 5b.—White, 11th Ann. Rep. Indiana Geol. Nat. Hist. Surv., 1882, p. 379, pl. 46, figs. 1-3.

Hellipora (*Constellaria*) *antheloidea* Rominger (not Hall), Proc. Acad. Nat. Sci. Philadelphia, 1866, p. 118.

Maysville (Fairview): Cincinnati, Ohio and vicinity; Tennessee.

Cotypes.—Cat. No. 43808, U.S.N.M.

CONSTELLARIA FLORIDA VAR. *EMACIATA* Hayes and Ulrich. See *Constellaria emaciata*.

Constellaria florida plana Ulrich.

Constellaria florida var. *plana* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 269, pl. 14, fig. 4.

Constellaria constellata-plana Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 213.

Maysville (Fairview): Cincinnati, Ohio, and vicinity.

Holotype.—Cat. No. 43645, U.S.N.M.

Constellaria florida prominens Ulrich.

Constellaria florida var. *prominens* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 269, pl. 14, fig. 3.

Constellaria constellata-prominens Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 214.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1907, p. 806, pl. 27, fig. 18.

Constellaria prominens Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 52, pl. 2, fig. 15.

Eden (McMicken) and Maysville (Fairview): Cincinnati, Ohio, and vicinity.

Holotype.—Cat. No. 43644, U.S.N.M.

Constellaria limitaris (Ulrich).

Stellipora limitaris Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 126, pl. 12, figs. 8-8c.

Constellaria limitaris Ulrich, *ibid.*, 6, 1883, p. 269, pl. 14, fig. 5, 5a.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 806, pl. 13, fig. 2; pl. 28, fig. 2.

Richmond (Waynesville-Whitewater): Clarksville, Waynesville, etc., Ohio; Versailles, etc., Indiana.

Cotypes and *plesiotypes*.—Cat. Nos. 43642, 43643, U.S.N.M.

Constellaria parva Ulrich.

Constellaria parva Ulrich, Geol. Surv. Illinois, 8, 1890, p. 424, pl. 34, figs. 1-1b.

Monticulipora (*Constellaria*) *parva* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1896, p. 119.

Richmond (Fernvale): Wilmington, Illinois.

Sections of *holotype*.—Cat. No. 43747, U.S.N.M.

Constellaria polystomella Nicholson.

Constellaria polystomella Nicholson, Pal. Ohio, 2, 1875, p. 215, pl. 22, figs. 7, 7a.—Whitfield, Geol. Surv. Wisconsin, 4, 1882, p. 257, pl. 12, figs. 3, 4.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 173, fig.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 214.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 808, pl. 13, figs. 1, 1b; pl. 18, fig. 1.

Constellaria polystomella—Continued.

Stellipora polystomella Miller, N. A. Geol. Pal., 1889, p. 203, fig. 217.

Monticulipora (Constellaria) polystomella (in part) J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, p. 118.

Richmond: Delafield, Wisconsin (Maquoketa); Wilmington, Illinois (Fernvale); Ohio; Indiana; and Kentucky (Waynesville-Whitewater).

CONSTELLARIA PROMINENS Nickles. See *Constellaria florida prominens*.

Constellaria punctata (Whitfield).

Monticulipora punctata Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1877, 1878, p. 71; Geol. Surv. Wisconsin, 4, 1882, p. 249, pl. 11, figs. 3, 4.—Buell, Trans. Wisconsin Acad. Sci., 5, 1882, p. 189.

Constellaria punctata Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 214.

Richmond (Maquoketa): Delafield and Iron Ridge, Wisconsin.

Constellaria teres Ulrich and Bassler.

Constellaria teres Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 37.—Hayes and Ulrich, U. S. Geol. Surv., fol. 95, illus. sheet, 1903, fig. 31.

Trenton (Bigby and Catheys): Columbia, etc., Tennessee; Kentucky.

Cotypes.—Cat. No. 43205, U.S.N.M.

Constellaria varia Ulrich.

Constellaria varia Ulrich, Geol. Minnesota, 3, pt. 1, 1893, p. 311, pl. 21, figs. 1-7.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 219-221, figs. 120-122.

Trenton: Cannon Falls, etc., Minnesota (Prosser); Belleville, Ontario; Belfast, Tennessee.

Ordovician (Wassaleum and Jewe): Uxnorn and Jewe, Esthonia, Russia.

Cotypes and plesiotypes.—Cat. Nos. 43546, 57300, 57301, U.S.N.M.

CONULARIA Miller.

Genotype: *C. quadrisulcata* Miller.

Conularia Miller, in Sowerby's Min. Conchology, 3, 1821, p. 107.—Dekoninck, Dec. Animaux Fossiles, Liege, 1842-1844, 1844, p. 494.—Hall, Pal. New York, 1, 1847, p. 222, footnote.—Sandberger, Neues Jahrb. f. Min., etc., 1847, p. 11.—Brown, Illust. Foss. Conch. Great Britain and Ireland, 1849, p. 43.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 9.—Dana, Wilkes U. S. Expl. Exped., 1838-1842, Geol., 1849, p. 708.—Woodward, Man. Mollusca, pt. 2, 1854, p. 206, fig. 108.—McCoy, British Pal. Rocks and Foss., 1854, p. 287.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 207.—Pictet, Traite de Pal., 2d ed., 3, 1855, p. 319.—Hall, Pal. New York, 3, 1859, p. 347, and footnote.—Chapman, Expos. Min. Geol. Canada, 1864, p. 122.—Barrande, Syst. Sil. Centre Boheme, 3, 1867, p. 1.—Salter, Cat. Camb. Sil. Foss., 1873, p. 67.—Etheridge, Geol. Mag., 10, 1873, p. 295.—Hall, Pal. New York, 5, pt. 2, 1879, p. 205.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 19, No. 6, 1881, p. 39.—Zittel, Handb. Pal., 2, 1882, p. 315.—Koninck Ann. Mus. Royal Hist. Nat. Belgium, 8, 1883, p. 219.—Miller, N. A. Geol. Pal., 1889, p. 390; 1st App., 1892, p. 692.—Holm, Sveriges Geol. Unders., Ser. C, No. 112, 1893, p. 113, 154.—Matthew, Canadian Rec. Sci., 5, 1893, p. 433.—A. Ulrich, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 8, 1893, p. 25.—Koken, Die Leitfossilien, Leipzig, 1896, p. 98, fig. 76.—Ruedemann, Amer. Geol., 17, 1896, p. 158; 18, p. 65.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 284.—Pilsbry, Zittel, Eastman Textb. Pal., 1, 1900, p. 490; 2d ed., 1913, p. 572.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 213; Bull. New York State Mus., 45, 1901, p. 213.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 12.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 950.

***Conularia amazonica* Clarke.**

Conularia amazonica Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Engl. ed., 1900, p. 20, pl. 2, figs. 23-25.

Silurian: Rio Trombetas, Brazil.

***Conularia asperata* Billings.**

Conularia asperata Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 21.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 201, pl. 21, figs. 2, 2a.

Richmond: Macasty Bay, Anticosti (English Head): Lake Winnipeg, Canada.

***Conularia bifurca* Ringueberg.**

Conularia bifurca Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, 1886, p. 18, pl. 2, fig. 11.

Clinton (Rochester): Lockport, New York.

***Conularia bilineata* Foerste.**

Conularia bilineata Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 547, pl. 37A, fig. 12. Upper Medinan (Brassfield): Soldiers Home, near Dayton, Ohio.

***Conularia formosa* Miller and Dyer.**

Conularia formosa Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 38, pl. 1, figs. 12, 12a.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 958, pl. 42, fig. 2.

Maysville and Richmond: Versailles, etc., Indiana; Cincinnati, Ohio, and vicinity.

***Conularia gattingeri* Safford.**

Conularia Gattingeri Safford, Geol. Tennessee, 1869, p. 289.

Trenton: Nashville, Tennessee.

***Conularia gracilis* Hall.**

Conularia gracilis Hall, Pal. New York, 1, 1847, p. 224, pl. 59, figs. 7a, b.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 207, pl. 16, fig. 7.—Leeley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 144, figs.—Ruedemann, Amer. Geol., 17, 1896, pp. 158-165, pl. 18, figs. 1-6; pl. 9, figs. 1-7; 18, pp. 65-71, pl. 2, figs. 1, 2; 15th Rep. State Geol. New York for 1895, 1898, p. 701, pls. 1-4; 49th Rep. New York State Mus., 2, 1898, p. 701, pls. 1-4.

Trenton: Near Middleville and Dolgeville, New York.

***Conularia granulata* Hall.**

Conularia granulata Hall, Pal. New York, 1, 1847, p. 223, pl. 59, figs. 5a, b.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 207, pl. 16, figs. 5a, b.—Leeley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 144, figs.

Trenton: Middleville, New York.

***Conularia hudsoni* Emmons.**

Conularia Hudsoni Emmons, Amer. Geology, 1, pt. 2, 1855, p. 208, fig. 65; Man. Geol., 1860, p. 103, fig. 93.—Leeley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 144, text fig.

Cincinnatian (Pulaski): Lorraine, Jefferson County, New York.

***Conularia indentata* Conrad.**

Conularia indentata Conrad, Proc. Acad. Nat. Sci. Philadelphia, 7, 1854, p. 31.

Trenton: Galena, Illinois.

***Conularia infrequens* Hall.**

Conularia infrequens Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 321, pl. 33, fig. 7; Trans. Albany Inst., 10, 1883, p. 73.

Niagaran (Waldron): Waldron, Indiana.

***Conularia laqueata* Conrad.**

- Conularia laqueata* Conrad, 5th Ann. Rep. New York Geol. Surv., 1841, p. 57.—
Hall, 15th Rep. New York State Cab. Nat. Hist., 1861, pl. 11, fig. 20.
Clinton (Rochester): Albion, Wayne County, New York.

***Conularia longa* Hall.**

- Conularia longa* Hall, Pal. New York, 2, 1852, p. 295, pl. 65, figs. 2a-d.
Clinton (Rochester): Lockport, New York.

***Conularia magnifica* Spencer.**

- Conularia magnifica* Spencer, Canadian Nat., n. s., 9, 1879, p. 63; Trans. Acad.
Sci. St. Louis, 4, 1884, p. 607, pl. 9, figs. 1, 1a, b; Bull. Mus. Univ. State
Missouri, 1, 1884, p. 58, pl. 9, figs. 1a-b.
Niagaran dolomite: Hamilton, Ontario.

***Conularia multipuncta* Ringueberg.**

- Conularia multipuncta* Ringueberg, Bull. Buffalo Soc. Nat. Sci., 5, 1886, p. 18,
pl. 2, fig. 10.
Clinton (Rochester): Lockport, New York.

***Conularia niagarensis* Hall.**

- Conularia niagarensis* Hall, Pal. New York, 2, 1852, p. 294, pl. 65, figs. 1a-h.—
Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 286, pl. 5, fig. 16; Geol.
Surv. Ohio, Pal., 7, 1898, p. 547, pl. 30, fig. 16.—Grabau, Bull. New York
State Mus., 45, 1901, p. 214, fig. 145; Bull. Buffalo Soc. Nat. Sci., 7, 1901,
p. 214, fig. 145.
Early Silurian: Lockport, etc., New York (Rochester); Dayton, Ohio (Brassfield).

***Conularia papillata* Hall.**

- Conularia papillata* Hall, Pal. New York, 1, 1847, p. 223, pl. 59, figs. 6a, b.—
Emmons, Amer. Geology, 1, pt. 2, 1855, p. 207, pl. 16, fig. 6.—Lesley, Geol.
Surv. Pennsylvania, Rep. P 4, 1889, p. 145, figs.
Trenton: Near Middleville, New York.

***Conularia quadrata* Walcott.**

- Conularia quadrata* Walcott, 28th Rep. New York State Mus. Nat. Hist., doc. ed.,
1875, p. 93; mus. ed., 1879, p. 93.
Trenton: Prospect Bridge, Oneida County, New York.

***Conularia quadrisulcata* (Miller?) Hall.**

- Conularia quadrisulcata* Miller in Sowerby's Min. Conch., 3, 1821, p. 107.—Hall,
Geol. New York, 4, 1843, p. 110, fig. 2; p. 111, tab. ill. 17, fig. 2.—Yandell
and Shumard, Cont. Geol. Kentucky, 1847, p. 15.—Lesley, Geol. Surv.
Pennsylvania, Rep. P 4, 1889, p. 145, fig.—Miller, N. A. Geol. Pal., 1889, p.
390, fig. 644.
Silurian: Europe; Lockport, Rochester, etc., New York (Niagaran).

***Conularia rugosa* Spencer.**

- Conularia rugosa* Spencer, Bull. Missouri State Mus., 1, 1884, p. 59, pls. 8, 9,
figs. 2, 2a; Trans. Acad. Sci. St. Louis, 4, 1884, p. 608, pls. 8, 9, figs. 2, 2a.
Niagaran dolomite: Hamilton, Ontario.

***Conularia splendida* Billings.**

- Conularia splendida* Billings, Cat. Sil. Foss Anticosti, Geol. Surv. Canada, 1866,
p. 21.
Richmond (Charleton): Charleton Point, Anticosti.

Conularia transversa Ringueberg.

Conularia transversa Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, 1886, p. 19, pl. 2, fig. 12.

Clinton (Rochester): Lockport, New York.

Conularia trentonensis Hall.

Conularia trentonensis Hall, Pal. New York, 1, 1847, p. 222, pl. 59, figs. 4a-f.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 207, pl. 16, figs. 4a-f.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 819, fig. 609.—Hall, Pal. New York, 3, 1859, p. 347-348.—Chapman, Canadian Jour., n. s., 7, 1862, p. 118, fig. 116; 8, 1863, p. 199, fig. 191; Expos. Min. Geol. Canada, 1864, p. 122, fig. 116; p. 171, fig. 191.—Emerson, Narrative Hall's 2d Arctic Exped., U. S. Navy Dep., 1879, p. 578.—Ami, Trans. Ottawa Field Nat. Club, 1, 1882, p. 64.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 167, fig.—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 146, 2 figs.—Ruedemann, Bull. New York State Mus., 8, 1901, p. 520.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 188, pl. 3, figs. 7, 8. Trenton: Middleville, Trenton Falls, etc., New York; Canada; Iowa; New Jersey; etc.

Conularia trentonensis multicoستا Ruedemann.

Conularia trentonensis var. *multicoستا* Ruedemann, Bull. New York State Mus., 162, 1912, p. 115.

Trenton: Watervliet, New York (Snake Hill); Schoharie Junction and Schenectady, New York (Schenectady).

Conularia trentonensis rogersensis Foerste.

Conularia trentonensis rogersensis Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 142, pl. 1, fig. 16.

Trenton (Upper): Rogers Gap, Kentucky.

Conularia triangulata Raymond.

Conularia triangulata Raymond, Amer. Jour. Sci., 4th ser. 20, 1905, p. 379; Ann. Carnegie Mus., 4, 1908, p. 216, pl. 54, fig. 18.

Chazy (Valcour): Valcour Island, New York.

Conularia wilkinsi Spencer.

Conularia wilkinsi Spencer, Bull. Missouri State Mus., 1, 1884, p. 59, pl. 8, fig. 3; Trans. Acad. Sci. St. Louis, 4, 1884, p. 609, pl. 8, fig. 3.

Niagaran dolomite: Hamilton, Ontario.

CORALLIDOMUS Whitfield.

Genotype: *C. concentricus* Whitfield.

Corallidomus Whitfield, Geol. Surv. Ohio, Pal., 7, 1893, p. 493.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 780.

Corallidomus concentricus Whitfield.

Corallidomus concentricus Whitfield, Geol. Surv. Ohio, Pal., 7, 1893, p. 493, pl. 13, fig.; Ulrich, *ibid.*, pl. 55, figs. 15, 16.

Richmond (Liberty): Brown County, Ohio.

CORALLIUM GOTHLANDICUM LINNÆUS. See *Favosites gothlandica*.**CORDYLOCRINUS** Angelin.

Genotype: *C. comtus* Angelin.

Cordylocrinus Angelin, Icon. Crinoid, 1878, p. 3, pl. 23, fig. 6.—Zittel, Handb. Pal., 1, 1879, p. 365.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, pp. 232, 234 (Rev. Pal., pt. 2, pp. 58, 60); 1886, p. 337; 1890, p. 353.—Miller, N. A. Geol. Pal., 1889, p. 234.—Treatise on Zool. (Lankester), pt. 3, 1900, p. 156.—Zittel, Grundzuge Pal., 1, 1910, p. 157.

Cordylocrinus? dubius Rowley.

Cordylocrinus? dubius Rowley, Amer. Geol., 34, 1904, p. 272, pl. 16, figs. 20-22.

Niagaran (Bainbridge): Near St. Mary's, Ste. Genevieve County, Missouri.

CORDYLOCRINUS PARVUS Wachsmuth and Springer. See *Cordylocrinus plumosus*.

Cordylocrinus plumosus (Hall).

Platycrinus plumosus Hall, Pal., New York, 3, 1859, pp. 113, 148, pl. 4, figs. 1-5.

Platycrinus parvus Hall, Pal., New York, 3, 1859, p. 114, pl. 4, figs. 6-9.

Cordylocrinus plumosus Wachsmuth and Springer, Rev. Pal., pt. 2, 1881, p. 61; Proc. Acad. Nat. Sci. Philadelphia, 33, 1882, p. 235; N. Amer. Cri. Cam., 2, 1897, p. 737; Atlas, pl. 75, fig. 20.—Talbot, Amer. Jour. Sci., 20, 1905, p. 28, fig. 3, pl. 3, figs. 2, 4.

Cordylocrinus parvus Wachsmuth and Springer, Rev. Pal., pt. 2, 1881, p. 60; Proc. Acad. Nat. Sci. Philadelphia, 33, 1882, p. 234; N. Amer. Crin. Cam., 2, 1897, p. 737.

Clematocrinus plumosus Jaekel, Zeit. d. d. Geol. Gesell., 49, 1897, Verhandl., p. 47.

Clematocrinus parvus Jaekel, ibid., p. 737.

Helderbergian (Manlius transition beds or Coeymans): Jerusalem Hill and North Litchfield, New York.

COREMATOCLADUS Ruedemann.

Genotype: *C. densa* Ruedemann.

Corematocladus Ruedemann, Bull. New York State Mus., 133, 1909, p. 205.

Corematocladus densa Ruedemann.

Corematocladus densa Ruedemann, Bull. New York State Mus., 133, 1909, p. 206, pl. 3, figs. 1-5.

Black River (Lowville): Glens Falls, New York.

CORNULITES Schlotheim.

Genotype: *C. serpularius* Schlotheim.

Cornulites Schlotheim, Petrefaktenkund, 1820, p. 378.—McCoy, Brit. Pal. Rocks and Foss., 1854, p. 63.—Barrande, Syst. Sil. Centre Boheme, 3, 1867, p. 167.—Nicholson, Amer. Jour. Sci., 3d ser., 3, 1872, pp. 202, 204.—Hall, Pal. New York, 5, pt. 2, 1879, p. 164.—Zittel, Handb. Pal., 1, 1879, p. 564.—Vine, Quart. Jour. Geol. Soc. London, 38, 1882, pp. 378, 379.—Hall, Pal., New York, 7, sup. 1888, p. 8.—Miller, N. A. Geol. Pal., 1889, p. 517.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 150.—Hinde, Zittel-Eastman Textb. Pal., 1, 1900, p. 253.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 161; Bull. New York State Mus., 45, 1901, p. 161.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 238.—Zittel-Eastman Textb., Pal., 2d ed., 1913, p. 139.

Conchicolites Nicholson, Amer. Jour. Sci., 3d ser., 3, 1872, pp. 203-204; Geol. Mag., 10, 1873, p. 54; Cincinnati Quart. Jour. Sci., 1, 1874, p. 236.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 7, p. 238.—Zittel, Handb. Pal., 1, 1879, p. 564.—Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1880, p. 260.—Vine, Quart. Jour. Geol. Soc. London, 38, 1882, pp. 378, 381.—Miller, N. A. Geol. Pal., 1889, p. 517.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 237.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 139 (Genotype *C. gregarius* Nicholson).

Ortonia Nicholson, Geol. Mag., 9, 1872, pp. 447, 448; Rept. 42d Meeting Brit. Assoc. Adv. Sci., Notes and Abstracts, 1873, p. 119; Cincinnati Quart. Jour. Sci., 1, 1874, p. 236.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, pp. 9, 10, 238.—Zittel, Handb. Pal., 1, Munich, 1879, p. 564.—Etheridge, Geol. Mag., dec. 2, 7, 1880, p. 366.—Vine, Quart. Jour. Geol. Soc. London, 38, 1882, pp. 378.—Nicholson, Rept. Pal. Prov. Ontario, pt. 1, 1874, p. 122.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 239.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 139 (Genotype *O. conica* Nicholson).

Cornulites arcuatus Conrad.

Cornulites arcuatus Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 276, pl. 17, fig. 8.—Hall, Nat. Hist. New York, Geol., 4, 1843, p. 109, fig. 3; p. 110; tab. ill. 16, fig. 3.—Emmons, Man. Geol., 1860, p. 108, fig. 98.—Hall, Pal. New York, 7, Sup., 1888, p. 19, pl. 116A, fig. 9.—Miller, N. A. Geol. Pal., 1889, p. 518, fig. 937.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 105, pl. 4, figs. 1-5.—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 201, pl. 22, figs. 4-6.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 239, fig. 1524.

Silurian (Lockport-Guelph, Cobleskill): Albion, Orleans County, etc., New York.

Upper Monroan (Amherstburg): Detroit River, opposite Amherstburg, Ontario.

Cornulites bellistriatus Hall.

Cornulites ——— Hall, Pal. New York, 2, 1852, p. 353, pl. 85, figs. 12-17.

Cornulites bellistriatus Hall, Pal. New York, 7, Sup., 1888, p. 20, pl. 116A, figs. 12, 13.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 161, fig. 56; Bull. New York State Mus., 45, 9, 1901, p. 161, fig. 56.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 238, fig. 1523.

Clinton (Rochester): Western New York; Ontario.

Cornulites cingulatus Hall.

Cornulites cingulatus Hall, Pal. New York, 7, 1888, p. 20 (supplement to 5), pl. 114, fig. 29.—Clarke, Mem. New York State Mus., 3, No. 3, 1900, p. 27, pl. 2, figs. 35-38.—Weller, Geol. Surv. New Jersey Pal., 3, 1903, p. 272, pl. 32, fig. 3.—Ohern, Maryland Geol. Surv., Low. Dev., 1913, p. 258, pl. 40, fig. 16.

Helderbergian: New York (New Scotland); Pinto, Maryland (Keyser); New Jersey. Also Oriskany of New York.

Cornulites clintoni Hall.

Cornulites flexuosus Hall (not Hall, 1847), Pal. New York, 2, 1852, p. 98, pl. 28, fig. 12a-e; 5, pt. 2, 1879, p. 156, footnote; 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 184.

Cornulites clintoni Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 330; Pal. New York, 7, Sup., 1888, p. 18, pl. 116, fig. 22; pl. 116A, fig. 9.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 10.

Cornulites serpularius var. *clintoni* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 274, pl. 5, fig. 8, pl. 7, fig. 8.

Clinton: Lockport, etc., New York; Hamilton, etc., Ontario (Irondequoit and Rochester); Lewis County, Kentucky.

Cornulites clintoni gracilis (Hall).

Cornulites flexuosus var. *gracilis* Hall, Canadian Nat. Geol., 5, 1860, p. 155.—Dawson, Acadian Geol., 2d ed., 1868, p. 606.

Silurian: Arisaig, Nova Scotia.

Cornulites conticus (Nicholson).

Ortonia conica Nicholson, Geol. Mag., 9, 1872, pp. 447, 448, fig. 1; Rep. 42d Meeting Brit. Assoc. Adv. Sci., Notes and Abstracts, 1873, p. 119.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 11, fig. 4.—Hall, Pal. New York, 7, Sup., 1888, p. 17, pls. 115, fig. 27; 116A, figs. 15, 16.

Maysville: Cincinnati, Ohio, and vicinity.

Cornulites contractus Ringueberg.

Cornulites contractus Ringueberg, Proc. Acad. Nat. Sci. Philadelphia, 1884, p. 148, pl. 3, fig. 6.

Clinton (Rochester): Lockport, New York.

Cornulites corrugatus (Nicholson).

Conchicolites corrugatus Nicholson, Geol. Mag., 10, 1873, p. 55, pl. 4, fig. 2.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 7.—Hall, Pal. New York, 7, Sup., 1888, p. 17, pls. 115, fig. 27; 116A, figs. 17, 18.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 237, fig. 1522.

Maysville: Cincinnati, Ohio, and vicinity.

Cornulites distans Hall.

Tentaculites distans Hall, Pal. New York, 2, 1852, p. 184, pl. 41A, figs. 9, a, b.—Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 144.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 48.

Cornulites distans Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 185; Pal. New York, 5, pt. 2, 1879, p. 163 (gen. ref.); 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 330 (gen. ref.); Pal. New York, 7, Sup., 1888, p. 18, pl. 116, fig. 23.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 274, pl. 5, fig. 7; pl. 6, figs. 10, 11; Geol. Surv. Ohio Pal., 7, 1893, p. 532, pl. 30, fig. 7; pl. 31, figs. 10, 11.—Miller, N. A. Geol. Pal., 1889, p. 518, fig. 938.

Upper Medinan: Flamborough Head, etc., Ontario (Cataract); Dayton, Ohio (Brassfield); Arisaig, Nova Scotia.

Cornulites flexuosus (Hall).

Tentaculites? flexuosa Hall, Pal. New York, 1, 1847, p. 92, pl. 29, figs. 6a-d; p. 284, pl. 78, fig. 2a, b.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 225, pl. 17, fig. 6.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 76.—Emmons, Man. Geol., 1860, p. 102, fig. 6.—Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 255; Geol. Surv. Illinois, 3, 1868, p. 343.

Cornulites flexuosus Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 330; Pal. New York, 7, Sup., 1888, p. 18, pl. 115, figs. 41, 42.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1067, pl. 32, fig. 11.

Conchicolites flexuosus Miller, N. A. Geol. Pal., 1889, p. 517, fig. 936.

Trenton: Lowville, New York.

Cincinnatian: Turin, Pulaski, etc., New York (Pulaski); Cincinnati, Ohio, and vicinity (Maysville).

CORNULITES FLEXUOSUS Hall (part). See *Cornulites clintoni*.

CORNULITES FLEXUOSUS var. *GRACILIS* Hall. See *Cornulites clintoni gracilis*.

Cornulites gregarius (Nicholson).

Conchicolites gregarius Nicholson, Man. Pal., 1, 1889, p. 477, fig. 342; Amer. Jour. Sci., 3d ser., 3, 1872, p. 204.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 238.

Ordovician: England; Cincinnati, Ohio(?).

Cornulites immaturus Hall.

Cornulites immaturus Hall, Pal. New York, 7, Sup., 1888, p. 18, pl. 115, fig. 40.

Utica: Holland Patent, Oneida County, New York.

Cornulites incurvus (Shumard).

Tentaculites incurvus Shumard, 1st and 2d Ann. Rep. Geol. Surv. Missouri, pt. 2, 1855, p. 195, pl. B, fig. 6a, b.—Keyes, Missouri Geol. Surv., 5, 1894, p. 217, pl. 35, fig. 3.

Cornulites incurvus Hall, Pal. New York, 7, Sup., 1888, p. 18, pls. 115, fig. 31; pl. 116, fig. 31.—Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 41, pl. 2, fig. 7.

Upper Medinan (Girardeau): Near Cape Girardeau, Missouri.

Cornulites minor (Nicholson).

Ortonia minor Nicholson, Geol. Mag., 10, 1873, p. 56, pl. 4, fig. 3.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 10.—Hall, Pal. New York, 7, Sup., 1888, p. 17, pl. 115, fig. 3; pl. 116A, figs. 19, 20.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 240, fig. 1525c.

Conchicolites minor Miller, N. A. Geol. Pal., 1889, p. 517.

Maysville: Cincinnati, Ohio, and vicinity.

Cornulites nodosus Ringueberg.

Cornulites nodosus Ringueberg, Proc. Acad. Nat. Sci. Philadelphia, 1884, p. 149, pl. 3, fig. 7.

Clinton (Rochester): Lockport, New York.

Cornulites proprius Hall.

Cornulites propius Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, 1877, pl. 31, figs. 1-13; mus. ed., 1879, p. 182, pl. 31, figs. 1-13; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 327, pl. 32, figs. 1-13; Pal. New York, 7, Sup., 1888, p. 19, pl. 116, figs. 1-21.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 238, fig.

Niagaran: Waldron, etc., Indiana; Tennessee (Waldron); Nova Scotia.

Cornulites richmondensis (Miller).

Tentaculites Richmondensis Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 234, fig. 28.—Hall, Pal. New York, 5, pt. 2, 1879, p. 163; 7, Sup., 1888, p. 18, pl. 115, figs. 28-30, 33-39.—Miller, N. A. Geol. Pal., 1889, p. 393, fig. 650.

Cornulites richmondensis Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1065, pl. 42, fig. 5.

Richmond (Whitewater): Richmond, etc., Indiana.

Observation.—Compare *C. sterlingensis* Meek and Worthen.

CORNULITES SERPULARIS var. **CLINTONI** Foerste. See *Cornulites clintoni*.

Cornulites sterlingensis (Meek and Worthen).

Tentaculites Sterlingensis Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1885, p. 255; Geol. Surv. Illinois, 3, 1868, p. 343, pl. 4, fig. 8.—Hall, Pal. New York, 5, pt. 2, 1879, p. 163; 7, Sup., 1888, p. 17, pl. 115, figs. 5-7, 32.

Richmond (Maquoketa): Sterling, Illinois.

Cornulites tenuistriatus (Meek and Worthen).

Tentaculites tenuistriatus Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 254; Geol. Surv. Illinois, 3, 1868, p. 341, pl. 4, figs. 7a, b.

Cornulites tenuistriatus Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1066.—Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 41, pl. 2, fig. 6.

Upper Medinan (Girardeau): Alexander County, Illinois.

?Richmond: Richmond, Indiana.

CORYDOCEPHALUS Hawle and Corda.

Genotype: *C. flabellatus* Hawle and Corda.

Corydocephalus Hawle and Corda, Abh. d. k. Bohmischen Gesell. d. Wiss., 5 (extract), 1847, p. 139, pl. 7, fig. 74.—Reed, Quart. Jour. Geol. Soc. London, 58, 1902, pp. 61-63, sec. A, pp. 70, 81, 82.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 309.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 721.

Corydocephalus byrnesanus (Miller and Gurley).

Lichas byrnesanus Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 3, 1893, p. 78, pl. 8, figs. 8, 9.

Niagaran (Laurel): Near Madison, Indiana.

Corydocephalus depauperatus (Van Ingen).

Arges phlyctainoides depauperatus Van Ingen, School of Mines Quart., 23, 1901, p. 57.

Niagaran (St. Clair): St. Clair Spring, Independence County, Arkansas.

Corydocephalus phlyctainoides (Green).

Calymene phlyctainoides Green, Amer. Jour. Sci., 32, 1837, p. 167.

Arges phlyctainoides Hall, Pal. New York, 2, 1852, p. 314, pl. 70, figs. 2a-2c.—Van Ingen, School of Mines Quart., 23, 1901, p. 57, pl., figs., 18, 18a.

Lichas hanoverensis Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 3, 1893, p. 78, pl. 8, figs. 6-7.

Lichas phlyctainoides Foerste, Geol. Surv. Ohio Pal., 7, 1893, p. 529, pl. 37A, fig. 15; pl. 27, fig. 11.

Corydocephalus phlyctainoides Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 234, pl. 22, figs. 1-4.

Corydocephalus phlyctainoides Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 310, fig. 1621b-e.

Niagaran: Springfield, Ohio; Indiana; New York; Illinois; Arkansas.

Plesiotype: Cat. No. 4918, U. S. N. M. (Green).

Corydocephalus ptyonurus (Hall and Clarke).

Lichas (Dicranognmus) ptyonurus Hall and Clarke, Pal. New York, 7, 1888, p. 86, pl. 19B, figs. 19-21.

Cayugan (Cobleskill): Schoharie, New York.

Corydocephalus tuberculatus (Weller).

Arges tuberculatus Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 199, pl. 15, figs. 11-13.

Trenton: Near Iliff's Pond, New Jersey.

Corydocephalus wesenbergensis paullianus (Clarke).

Lichas (Arges) wesenbergensis var. *paullianus* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 744, figs. 62-64.

Lichas paullianus Miller, N. A. Geol. Pal., 2d App., 1897, p. 788 (gen. ref.).

Trenton (Prosser): St. Paul and Wykoff, Minnesota.

CORYMBOCRINUS Angelin.

Genotype: *Eucalyptocrinus polydorus* McCoy.

Corymbocrinus Angelin, Icon. Crinoid., 1878, p. 18, pl. 8, figs. 1, 6-12; pl. 21, fig.

17.—Zittel, Handb. Pal., 1, 1879, p. 373.—Wachsmuth and Springer, Proc.

Acad. Nat. Sci. Philadelphia, 1881, p. 308 (Rev. Pal., pt. 2, p. 134); 1885, p.

328.—Weller, Jour. Geol., 6, 1898, p. 700; Bull. Chicago Acad. Sci., Nat.

Hist. Surv., 4, pt. 1, 1900, p. 99, fig. 45.—Wachsmuth, Zittel-Eastman Textb.

Pal., 1, 1900, p. 147.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p.

162.—Zittel, Grundzuge Pal., 1, 1910, p. 163.

Corymbocrinus chicagoensis Weller.

Corymbocrinus chicagoensis Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 100, pl. 4, figs. 1-3.

Niagaran (Racine): Chicago, Cicero, and Romeo, Illinois.

Corymbocrinus niagarensis Weller.

Corymbocrinus niagarensis Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 101, pl. 4, figs. 4, 5.

Niagaran (Racine): Chicago, Illinois.

CORYNOGRAPTUS Hopkinson. See *Corynoides* Nicholson.

CORYNOIDES Nicholson.Genotype: *C. calicularis* Nicholson.

Corynoides Nicholson, Geol. Mag., 4, 1867, p. 108; Mon. British Grapt., 1872, p. 132.—Zittel, Handb. Pal., 1879, p. 289.—Nicholson and Lydekker, Man. Pal., 1887, p. 215.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 228-234.

Corynograptus Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 633.

Corynoides calicularis Nicholson.

Graptolite germs Hall, Pal. New York, 3, 1859, p. 508, fig. 7; Can. Org. Rem., dec. 2, 1865, pl. B, fig. 19.

Corynoides calicularis Nicholson, Geol. Mag., 4, 1867, p. 108; pl. 7, figs. 9-11.—Hopkinson, Geol. Mag., 9, 1872, p. 502.—Nicholson, Mon. British Grapt., 1872, p. 132, fig.; Ann. Mag. Nat. Hist., 11, 1873, p. 143.—Lapworth, Cat. West. Scot. Foss., 1876, p. 7, pl. 4, fig. 91; Rep. and Proc. Belfast Nat. Field Club, 1, pt. 4, App., 1877, pl. 7, fig. 18.—Linnarsson, Sveriges Geol. Unders., ser. C, No. 31, 1879, p. 18.—Lapworth, Proc. and Trans. Roy. Soc. Canada, 4, 1887, p. 177.—Nicholson and Lydekker, Man. Pal., 1889, p. 215, fig. 96.—Gurley, Jour. Geol., 4, 1896, pp. 94, 301.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 515.—Clarke, Geol. Mag., 4th ser., 9, 1902, p. 498.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 214, pl. 16, figs. 12, 13.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 234-237, figs. 122-132; pl. 13, figs. 1, 6-8.—Bassler, Bull. Virginia Geol. Surv., 2a, 1909, pl. 7, figs. 9, 10.

Chazyan: (Normanskill): Glenmont, Albany, and other localities in slate belt of New York; Pennsylvania; Maryland; Virginia.

Ordovician: Wales; Scotland; Scandinavia.

Corynoides curtus Lapworth.

Corynoides curtus Lapworth, Cat. West. Scot. Foss., 1876, p. 7, pl. 4, fig. 92; Rep. and Proc. Belfast Nat. Field Club, 1, pt. 4, App., 1877, pl. 7, fig. 19.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 514ff; Mem. New York State Mus., 11, pt. 2, 1908, pp. 240, 241, figs. 140-144; pl. 13, figs. 4, 17-21.

Trenton (Snake Hill): Albany, Amsterdam, etc., New York; Panton, Vermont. Ordovician (Hartfell): Ireland.

Corynoides curtus comma Ruedemann.

Corynoides curtus Ruedemann, Bull. New York State Mus., 42, 1901, p. 526.

Corynoides curtus var. *comma* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 242, pl. 13, figs. 5, 22-24, 145-148.

Trenton (Snake Hill): Mechanicsville, New York.

Corynoides gracilis Hopkinson.

Corynoides gracilis Hopkinson, Geol. Mag., 9, 1872, p. 502, pl. 12, fig. 1.—Lapworth, Cat. West. Scot. Foss., 1876, p. 7, pl. 4, fig. 93.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 237-239, figs. 133-135; pl. 13, figs. 2, 2, 12, 15, 16.

Ordovician: Scotland (Hartfell); Lansingburg, Troy, and Baker Falls, New York (Trenton-Snake Hill).

Corynoides gracilis perungulatus Ruedemann.

Corynoides gracilis mut. *perungulatus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 239-240, figs. 136-139; pl. 13, figs. 3, 9, 10, 11, 13, 14.

Chazyan (Normanskill): Glenmont, Speigletown, near Troy, and Mount Moreno, near Hudson, New York; Arkansas.

CORYNOTRYPA Bassler.Genotype: *Hippothoa delicatula* James.*Stomatopora* (part) of authors.*Corynotrypa* Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 501; Bull. U. S. Nat. Mus., 77, 1911, p. 61; Zittel-Eastman Textb. Pal., 1913, p. 319.***Corynotrypa abrupta*** Bassler.*Corynotrypa abrupta* Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 517, figs. 16, 17; Bull. U. S. Nat. Mus., 77, 1911, pp. 65, 66, figs. 11, 12.

Richmond (Maquoketa): Iron Ridge, Wisconsin.

Lyckholm limestone: Kertel, Island of Dago, Baltic Sea.

Holotype and *paratype*.—Cat. Nos. 54173, 57109, U.S.N.M.***Corynotrypa barberi*** Bassler.*Corynotrypa barberi* Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 509, fig. 8; Bull. U. S. Nat. Mus., 77, 1911, pp. 63, 64, fig. 9.

Chazyan (Ottoese): Knoxville, etc., Tennessee; southwest Virginia.

Lyckholm limestone: Hohenholm, Island of Dago, Baltic Sea.

Holotype and *paratype*.—Cat. No. 57105, 57106, U.S.N.M.***Corynotrypa canadensis*** (Whiteaves).*Stomatopora canadensis* Whiteaves, Pal. Foss., 3, 1897, p. 161, pl. 18, figs. 4, 4a.*Corynotrypa canadensis* Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 526, fig. 27.

Black River or Richmond: Little Black Island, Lake Winnipeg, Canada.

Corynotrypa curta Bassler.*Corynotrypa curta* Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 518, fig. 18.

Richmond (Maquoketa): Savannah, Illinois.

Cotypes.—Cat. No. 54171, U.S.N.M.***Corynotrypa delicatula*** (James).*Hippothoa delicatula* James, Paleontologist, No. 1, 1878, p. 6.*Stomatopora proutana* Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 39, pl. 1, figs. 4-4b.—Ulrich, *ibid.*, 12, 1890, p. 175, fig. 2c; Geol. Minnesota, 3, 1893, p. 117, pl. 1, figs. 8-12.*Rhopalonaria pertenuis* Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv., Minnesota, 1886, p. 59.*Stomatopora delicatula* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 419.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 118, fig. 178b.—Bassler, Proc. U. S. Nat. Mus., 30, 1908, p. 55, pl. 3, figs. 4-7.*Stomatopora tenuissima* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 175, fig. 2; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 261, fig. 412A; Geol. Minnesota, 3, pt. 1, 1893, p. 116, pl. 1, figs. 16, 17.*Stomatopora delicatula-tenuissima* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 419.*Corynotrypa delicatula* Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 506, figs. 3a, 4-7; Bull. U. S. Nat. Mus., 77, 1911, pp. 61-63, fig. 8; Zittel-Eastman Textb. Pal., 1913, p. 319, figs. 439a.

Stones River-Richmond: Various localities in the United States and Canada.

Middle Ordovician: Esthonia, Russia.

Pleiotypes.—Cat. Nos. 13615, 43260, 43263, 54156, 54165, U.S.N.M.***Corynotrypa dissimilis*** (Vine).*Aulopora* sp. Hall, Pal. New York, 2, 1852, pl. 50, figs. 27, 29.*Stomatopora dissimilis* Vine, Quart. Jour. Geol. Soc. London, 37, 1881, pp. 615, 616, figs. 1-8; 38, 1882, p. 50.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 15, 16, pl. 4, figs. 15-19.

***Corynotrypa dissimilis*—Continued.**

Corynotrypa dissimilis Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 523, figs. 23, 24;
Bull. U. S. Nat. Mus., 77, 1911, pp. 68, 69, fig. 14.

Stomatopora recta Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, 1886, p. 20, pl. 2,
pp. 15, 15a.

Stomatopora minor Hennig, Archiv fur Zool., Kongl. Sven. Vet.-Akad. Stockholm,
3, No. 10, 1906, p. 24, pl. 3, fig. 6.

Silurian: England, Gotland, and Esthonia; Island of Anticosti; New York and
Ontario (Rochester); Indiana, Kentucky, and Tennessee (Osgood-
Louisville).

Plesiotypes.—Cat. Nos. 35473, 35475, 57112, U.S.N.M.

***Corynotrypa elongata* (Vine).**

Stomatopora dissimilis var. *elongata* Vine, Quart. Jour. Geol. Soc. London, 38,
1882, p. 50.

Stomatopora elongata Vine, Ann. Mag. Nat. Hist., 5th ser., 14, 1884, p. 85, fig.
4, 2.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 14, 15, pl. 4, figs. 10-14.

Corynotrypa elongata Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 510, fig. 9.

Stomatopora parva Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, 1886, p. 20, pl.
2, fig. 16.

Silurian: Shropshire, England (Wenlock); Sevenmile Creek, near Eaton, Ohio
(Brassfield); Rochester and Lockport, New York (Rochester); Newsom, Ten-
nessee (Waldron); Island of Anticosti.

Plesiotypes.—Cat. Nos. 35475, 57107, U.S.N.M.

***Corynotrypa inflata* (Hall).**

Alecto inflata Hall, Pal. New York, 1, 1847, p. 77, pl. 26, figs. 7a, b.

Hippothoa inflata Nicholson, Pal. Ohio, 2, 1875, p. 268, pl. 25, figs. 1-1b; Rep.
44th Meeting British Assoc. Adv. Sci., Notes and Abstracts, 1875, p. 90.—
Vine, Rep. 51st Meeting British Assoc. Adv. Sci., 1882, p. 163.

Stomatopora inflata Vine, Quart. Jour. Geol. Soc. London, 37, 1881, p. 615.—
Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 176, fig. 3c; Geol. Minne-
sota, 3, 1893, p. 117, pl. 1, figs. 13-21; Zittel's Textb. Pal. (Engl. ed.), 1896,
fig. 412B (p. 261).—Simpson, 14th Ann. Rep. State Geol. New York for
1894, 1897, figs. 202-204 (p. 597).—Ruedemann, Bull. New York State
Mus., 49, 1902, p. 12, pl. 1, figs. 2, 3.—Grabau and Shimer, N. A. Index
Fossils, 1, 1907, p. 118, fig. 178a.—Cummings, 32d Ann. Rep. Geol. Nat. Res.
Indiana, 1908, p. 886, pl. 32, figs. 1, 1a.

Stomatopora inflata Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1106,
figs.

Corynotrypa inflata Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 515, figs. 12-14;
Bull. U. S. Nat. Mus., 77, 1911, pp. 64, 65, fig. 10; Zittel-Eastman Textb.
Pal., 1913, p. 319, fig. 439b.

Black River-Richmond: Trenton Falls, etc., New York; Canada; Minnesota;
Kentucky; Tennessee; etc.

Middle Ordovician (Wesenberg): Esthonia, Russia.

Plesiotypes.—Cat. Nos. 54146, 54162, 54169, U.S.N.M.

***Corynotrypa medialis* Bassler.**

Corynotrypa medialis Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 519, fig. 19.

Richmond (Maquoketa): Three miles north of Spring Valley, Minnesota.

Holotype.—Cat. No. 57110, U.S.N.M.

***Corynotrypa tennesseensis* Bassler.**

Corynotrypa tennesseensis Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 525, fig. 25.

Stones River (Pierce): Near Murfreesboro, Tennessee.

Cotypes.—Cat. No. 54177, U.S.N.M.

Corynotrypa turgida (Ulrich).

Stomatopora turgida Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 176, fig. 3; Geol. Minnesota, 3, 1893, p. 118, pl. 1, figs. 22, 23.

Corynotrypa turgida Bassler, Proc. U. S. Nat. Mus., 39, 1911, p. 520, fig. 20.

Richmond (Fernvale): Wilmington, Illinois.

Holotype and *pleiotype*.—Cat. Nos. 43258, 54155, U.S.N.M.

COSCINTUM PROAVUS Eichwald. See *Graptodictya proava*.

COSCINOPORA SULGATA Owen. See *Receptaculites oweni*.

CRANIA Retzius.

Genotype: *Anomia craniolaris* Linnaeus.

Crania Retzius, Schrift. Ges. Naturf. Freunde, Berlin, 2, 1871, p. 72.—Eichwald, Zool. Specialis, pt. 1, Vilnae, 1829, p. 273.—Davidson, British Foss. Brach., Pal. Soc., 1853, pp. 37, 122.—Woodward, Man. Mollusca, pt. 2, 1854, p. 236, figs. 157, 159.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 66.—Davidson, Mon. British Carb. Brach., Pal. Soc., 1861, p. 192.—Dall, Amer. Jour. Conch., 7, 1871, p. 71; Bull. Mus. Comp. Zool., 3, 1871, p. 27.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, pp. 11, 12.—Dall, Bull. U. S. Nat. Mus., 8, 1877, p. 21.—Winchell, 8th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1880, p. 63.—Miller, N. A. Geol. Pal., 1889, p. 341.—Nettelroth, Kentucky Foss. Shells, Mem. Geol. Surv. Kentucky, 1889, p. 31.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 145, 169.—Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 372.—Hall and Clarke, 11th Ann. Rep. New York State Geol., 1894, p. 260.—Koken, Die Leitfossilien, Leipzig, 1896, p. 232, figs. 191, 1-3.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 80.—Huene, Neues Jahrb. f. Min., Geol. and Pal., 1, 1899, p. 142.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 185.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 311.

Crania acadiensis Hall.

Crania acadiensis Hall, Canadian Nat. Geol., 5, 1860, p. 144, fig. 1.—Dawson, Acadian Geol., Suppl. Chap., 1860, p. 68, fig. 47; 3d ed., 1878, p. 595, fig. 198. Silurian: East River, Nova Scotia.

Crania albersi Miller and Faber.

Crania albersi Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 154, pl. 8, figs. 17-19.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 760, fig. 1406. Eden (Economy): Cincinnati, Ohio, and vicinity.

CRANIA ALTERNATA James. See *Crania scabiosa*.

Crania anna Spencer.

Crania anna Spencer, Bull. Univ. Missouri, 1, 1884, p. 57; Trans. St. Louis Acad. Sci., 4, 1886, p. 607, pl. 8, fig. 4. Niagaran dolomite: Hamilton, Ontario.

CRANIA ASPERULA James. See *Crania scabiosa*.

CRANIA CORRUGATA Lealey. See *Lichenalia concentrica*.

CRANIA COSTATA James. See *Crania scabiosa*.

CRANIA? DEFORMATA Miller. See *Archinacella deformata*.

Crania dentata Ringueberg.

Crania dentata Ringueberg, Bull. Buffalo Soc. Nat. Sci., 5, 1886, p. 16, pl. 2, fig. 6. Clinton (Rochester): Lockport, New York.

***Crania? dubia* Foerste.**

Crania? dubia Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 565, pl. 37A, figs. 17a, b.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 189.

Upper Medinan (Brassfield): Soldiers' Home, near Dayton, Ohio.

***Crania dyeri* Miller.**

Crania dyeri Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 13, fig. 3; N. A. Geol. Pal., 1889, p. 341, fig. 553.

Eden (Economy): Cincinnati, Ohio and vicinity.

CRANIA EXCENTRICA Miller. See *Orbicula excentrica*.

CRANIA FILOSA Hitchcock. See *Schizocrania filosa*.

***Crania gracilis* Ringueberg.**

Crania gracilis Ringueberg, Bull. Buffalo Soc. Nat. Sci., 5, 1886, p. 17, pl. 2, fig. 7.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 190.

Crania pannosa Ringueberg, Bull. Buffalo Soc. Nat. Sci., 5, 1886, p. 17, pl. 2, fig. 8. Clinton (Rochester): Lockport, New York.

***Crania granulosa* N. H. Winchell.**

Crania granulosa N. H. Winchell, 8th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1880, p. 63.—Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 343.—

Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 373, pl. 29, figs. 34, 35. Black River (Platteville): Minneapolis, Minnesota.

***Crania granulosa cumberlandensis* Foerste.**

Crania granulosa-cumberlandensis Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 41, pl. 5, fig. 8.

Black River (Lowville): Wells Creek Basin, near Cumberland, Tennessee; High Bridge, Kentucky.

CRANIA HALLI Sardeson. See *Petrocrania ulrichi*.

***Crania laelia* Hall.**

Crania laelia Hall, Descriptions n. sp. Crinoidea and Other Fossils, 1866, p. 13; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 220, pl. 7, fig. 16.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 12.—Hall and Whitfield, Pal. Ohio, 2, 1875, p. 75, pl. 1, fig. 16.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pl. 4H, fig. 1.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 207, fig. 242.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 897, pl. 33, fig. 2.

Maysville and Richmond: Cincinnati, Ohio, and many localities in Ohio, Indiana, Kentucky, Tennessee, etc.

CRANIA MINUTULA Miller. See *Schizotreta minutula*.

CRANIA MULTIPUNCTATA Miller. See *Crania scabiosa*.

CRANIA PANNOSA Ringueberg. See *Crania gracilis*.

CRANIA PARALLELA Ulrich. See *Crania scabiosa*.

CRANIA PERCARINATA Ulrich. See *Crania scabiosa*.

CRANIA PRONA Raymond. See *Petrocrania prona*.

CRANIA RETICULARIS Miller. See *Trematis reticularis*.

***Crania(?) reversa* Sardeson.**

Crania(?) reversa Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 77, pl. 3, figs. 6, 7.

St. Peter sandstone: St. Paul, Minnesota.

***Crania scabiosa* Hall.**

Crania scabiosa Hall, Descriptions n. sp. Crinoidea and other Foss., 1866, p. 13.; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 220, pl. 7, fig. 15.—Hall and Whitfield, Pal. Ohio, 2, 1875, p. 74, pl. 1, fig. 17.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 12.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 148, pl. 4H, figs. 23–28, 30, 31.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 191.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 206, fig. 240.—Cumings, 32d Ann. Rep., Dep. Geol. Nat. Res. Indiana, 1908, p. 898, pl. 33, fig. 3–3a.

Crania multipunctata Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 13, fig. 4.—N. A. Geol. Pal., 1887, p. 341, fig. 554.

Crania percarinata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 98, pl. 4, fig. 12.

Crania parallela Ulrich, *ibid.*, 1878, p. 98, pl. 4, fig. 13.

Crania asperula James, Palaeontologist, 3, 1879, p. 22.

Crania costata James, *ibid.*, 1879, p. 22.

Crania alternata James, *ibid.*, 1879, p. 23.

Philhedra scabiosa Huene, Neues Jahrb. f. Min., Geol. and Pal., 1, 1898, p. 147 (gen. ref.).

Eden-Richmond: Cincinnati, etc., Ohio; Indiana; Kentucky; Tennessee; Wisconsin; etc.

***Crania setifera* Hall.**

Crania setifera Hall, Trans. Albany Inst., 4, 1863, p. 209 (not Hall, 1866); 23th Rep. New York State Mus. Nat. Hist., doc. ed., 1876, pl. 21, figs. 8–10; Mus. ed., 1879, p. 148, pl. 21, figs. 8–10; 11th Rep. State Geol. Indiana, 1882, p. 283, pl. 21, figs. 8–10.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pl. 4H, fig. 18.—Crane, Geol. Mag., dec. 4, 2, 1895, pl. 5, fig. 20.

Niagaran (Waldron): Waldron, Indiana.

***Crania setigera* Hall.**

Crania setigera Hall, Descriptions n. sp. Crinoidea and other Fossils, 1866, p. 12; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 220, pl. 7, fig. 15.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pl. 4H, figs. 14–16.—Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 372, pl. 29, figs. 32, 33.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 207, fig. 241e–f.

Black River (Platteville and Decorah): Mineral Point and Beloit, Wisconsin; Decorah, Iowa; Minneapolis, Cannon Falls, etc., Minnesota.

***Crania siluriana* Hall.**

Crania siluriana Hall, Trans. Albany Inst., 4, 1863, p. 208; 28th Rep. New York State Mus. Nat. Hist., 1879, p. 148, pl. 21, figs. 3–7; 11th Rep. State Geol. Indiana, 1882, p. 282, pl. 21, figs. 3–7.—Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 13, pl. 1, figs. 1, 2.

Niagaran (Waldron): Waldron, Indiana; Tennessee.

***Crania socialis* Ulrich.**

Crania socialis Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 98, pl. 4, fig. 14.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pl. 4H, fig. 29.

Eden: Cincinnati, Ohio and vicinity.

Crania spinigera Hall.

Crania spinigera Hall, Descriptions n. sp. Foss. Waldron, Indiana, 1879, p. 13; 11th Rep. State Geol. Indiana, 1882, p. 283, pl. 27, fig. 1; Trans. Albany Inst., 10, 1883, p. 69.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pl. 4H, fig. 17.

Niagara (Waldron): Waldron, Indiana.

Crania trentonensis Hall.

Crania trentonensis Hall, Desc. n. sp. Crinoidea and other Fossils, 1866, p. 12; 24th Rep. New York State Geol. Nat. Hist., 1872, p. 219, pl. 7, figs. 11, 12.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pl. 4H, figs. 21, 22.—Winchell and Schuchert, Geol. Minnesota, 1893, p. 374, pl. 29, figs. 36, 37.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 207, fig. 241c-d.

Trenton: Middleville, New York; Cannon Falls, Minnesota; Janesville, Wisconsin; Dixon, Illinois.

CRANIELLA Ehlert. See *Petrocrania* Raymond.

CRANIOPS Hall. See *Pholidops* Hall.

Crateripora Ulrich.

Crateripora Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 29.

Observation.—The forms for which this genus was proposed have been found to be the basal articulating sockets of species of *Escharopora* and *Arthropora*.

CRATERIPORA ERECTA Ulrich. See *Arthropora shafferi*.

CRATERIPORA LINEATA Ulrich. See *Escharopora falciformia*.

CRATERIPORA LINEATA var. **EXPANSA** Ulrich. See *Escharopora falciformia*.

CRATEROPHYLLUM Foerste. See *Chonophyllum*, subgenus *Craterophyllum*.

CREMACRINUS Ulrich.

Genotype: *C. punctatus* Ulrich.

Cremacrinus Ulrich, Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 14, 1886, p. 107.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 201 (Rev. Pal., pt. 3, sec. 2, p. 277).—Ringueberg, Ann. New York Acad. Sci., 4, 1889, p. 396, 405.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 148.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 213.

Castocrinus Ringueberg, Ann. New York Acad. Sci., 4, 1889, p. 392, pl. 11, fig. 1; Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 332, pl. 14, fig. 9; Kongl. Sv. Vet. Akad. Handl., 25, No. 2, 1893, p. 21, 58, 61, fig. 13a, 63.—Miller, N. A. Geol. Pal., 2d App., 1907, p. 740.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 148, fig. 61, 1.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 154.—Zittel, Grundzuge Pal., 1, 1910, p. 152.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1890, p. 387. (Genotype: *Calceocrinus furcillatus* Billings.)

Cremacrinus articulatus (Billings).

Heterocrinus articulatus Billings, Geol. Surv. Canada, dec. 4, 1859, p. 51, pl. 4, fig. 8.

Calceocrinus (*Heterocrinus*) *articulatus* Walcott, 35th Rep. New York State Mus. Nat. Hist., 1883, p. 212.

Calceocrinus articulatus Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 130 (Rev. Pal., pt. 3, sec. 2, p. 206).—Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 113.

Cremacrinus articulatus—Continued.

Castocrinus articulatus Ringueberg, Ann. New York Acad. Sci., 4, 1889, p. 395, pl. 10, fig. 4.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 25 (loc. occ.).

Calceocrinus kentuckiensis Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 29, pl. 2, fig. 24, 25.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 740, fig. 1322.

Castocrinus Kentuckiensis Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 30.

Trenton (Curdsville): Ottawa and Kirkfield, Ontario; Mercer County, Kentucky.

Cremacrinus barrandei (Walcott).

Calceocrinus Barrandei Walcott, 35th Rep. New York State Mus. Nat. Hist., 1883, p. 212, pl. 17, figs. 1, 2 (author's ed., p. 6).

Cremacrinus barrandei Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, pp. 111, 113 (gen. ref.).

Trenton: Trenton Falls, New York.

Cremacrinus billingsianus (Ringueberg).

Castocrinus billingsianus Ringueberg, Ann. New York Acad. Sci., 4, 1889, p. 394, pl. 10, fig. 3 (separate, p. 7).

Trenton (?Curdsville): Ottawa, Ontario.

CREMACRINUS CHRYSALIS Ulrich. See *Eucheirocrinus chrysalis*.**Cremacrinus furcillatus** (Billings).

Calceocrinus furcillatus Billings, Ottawa Naturalist, 1, 1887, p. 51, pl., fig.

Castocrinus furcillatus Ringueberg, Ann. New York Acad. Sci., 4, 1889, p. 393, pl. 10, fig. 1.

Trenton (?Curdsville): Ottawa, Ontario.

Cremacrinus inaequalis (Billings).

Heterocrinus inaequalis Billings, Geol. Surv. Canada, dec. 4, 1859, p. 51, pl. 4, fig. 7a.

Calceocrinus inaequalis Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, pp. 130, 205 (Rev. Pal., pt. 3, sec. 2, pp. 206, 281).

Cremacrinus inaequalis Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, pp. 111, 113 (gen. ref.).

Castocrinus inaequalis Ringueberg, Ann. New York Acad. Sci., 4, 1889, p. 395, pl. 10, fig. 5.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 25 (loc. occ.).

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

Cremacrinus punctatus Ulrich.

Cremacrinus punctatus Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 107, fig. 1.

Black River (Decorah): Minneapolis, Minnesota.

CREMACRINUS RADIOULUS Ulrich. See *Eucheirocrinus radiculatus*.**Cremacrinus rugosus** (Billings).

Calceocrinus rugosus Billings, Ottawa Naturalist, 1, 1887, p. 53, pl., figs.—Miller, N. A. Geol. Pal., 1889, p. 230, fig. 259.

Castocrinus rugosus Ringueberg, Ann. New York Acad. Sci., 4, 1889, p. 393, pl. 10, fig. 2.

Trenton (Curdsville): Belleville, Ontario.

CRETICEPHALUS (LOGANELLUS) CENTRALIS Whitfield. See *Ptychoparia oweni*.

84243°—Bull. 92—15—19

CREPICEPHALUS (LOGANELLUS) GRANULOSUS Hall and Whitfield. See *Ptychoparia granulosa*.

CREPICEPHALUS (LOGANELLUS) HAGUEI Hall and Whitfield. See *Ptychoparia haguei*.

CREPICEPHALUS (LOGANELLUS) MACULOSUS Hall and Whitfield. See *Ptychoparia maculosa*.

CREPICEPHALUS (LOGANELLUS) UNISULCATUS Hall and Whitfield. See *Ptychoparia unisulcata*.

CREPIPORA Ulrich.

Genotype: *C. simulans* Ulrich.

Crepipora Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 157.—Miller, N. A. Geol. Pal., 1889, p. 299.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 380, 469; Geol. Minnesota, 3, 1893, p. 322.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 15.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 268.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 566.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 23.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 122.—Hennig, Archiv. fur Zool., 4, No. 21, 1908, p. 9.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 85, 86; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 328.

CREPIPORA EPIDERMATA Ulrich. See *Favositella epidermata*.

***Crepipora hemispherica* Ulrich.**

Crepipora hemispherica Ulrich, Geol. Surv. Illinois, 8, 1890, p. 472, pl. 40, figs. 5-5b.

Richmond: Wilmington, Illinois (Fernvale); Delafield, Wisconsin (Maquoketa).
Cotype.—Cat. No. 43234, U.S.N.M.

CREPIPORA IMPOLITA Ulrich. See *Anolotichia impolita*.

***Crepipora impressa* Ulrich.**

Crepipora impressa Ulrich, Geol. Surv. Illinois, 8, 1890, p. 471, pl. 40, figs. 2, 2a.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 566, figs. 135, 136.

Maysville (Fairmount): Covington, Kentucky.

Holotype.—Cat. No. 43231, U.S.N.M.

***Crepipora perampla* Ulrich.**

Crepipora perampla Ulrich, Geol. Minnesota, 3, 1893, p. 323, pl. 28, figs. 29-32; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 267, figs. 436A-C.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 328, figs. 464a-c.

Black River (Platteville): Chatfield and near Spring Valley, Minnesota.

Part of *holotype*.—Cat. No. 43235, U.S.N.M.

***Crepipora simulans* Ulrich.**

Crepipora simulans Ulrich, Geol. Surv. Illinois, 8, 1890, p. 470, pl. 39, figs. 4, 4a, pl. 40, figs. 3, 3a; p. 320, fig. 8b.—(Ulrich in press) Miller, N. A. Geol. Pal., 1889, p. 299, fig. 468.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, fig. 436D (p. 267).—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 566, figs. 133, 134.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 217.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 122, fig. 178k.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 328, fig. 464d.

Maysville (Fairmount): Cincinnati, Ohio; Indiana; Kentucky; Tennessee.

Cotypes.—Cat. No. 43230, U.S.N.M.

Crepipora? solida Ulrich.

Crepipora solida Ulrich, Geol. Surv. Illinois, 8, 1890, p. 472, pl. 40, figs. 4-4b.

Eden (Economy): Covington, Kentucky

Cotypes.—Cat. No. 43232, U.S.N.M.

Crepipora spatiosa Ulrich.

Crepipora spatiosa Ulrich, Geol. Minnesota, 3, 1893, p. 323.

Trenton (Cynthiana): Harrodsburg and Frankfort, Kentucky.

Holotype.—Cat. No. 43228, U.S.N.M.

Crepipora subaequata Ulrich.

Crepipora subaequata Ulrich, Geol. Minnesota, 3, 1893, p. 322, pl. 28, figs. 26-28.

Black River (Decorah): St. Paul, Minnesota.

Holotype.—Cat. No. 43233, U.S.N.M.

Crepipora venusta (Ulrich).

Chaetetes venustus Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 93, pl. 4, figs. 7, 7a.

Crepipora venusta Ulrich, *ibid.*, 5, 1882, p. 257.—Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 49, pl. 2, fig. 7.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 126.

Monticulipora (*Fistulipora*) *venusta* James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 33.

Trenton (Upper) and Eden (Economy): Covington, etc., Kentucky; Ohio; Indiana.

Holotype.—Cat. No. 43236, U.S.N.M.

CRESEIS CORRUGATA Matthew. See *Styliola corrugata*.

CRESEIS MINUTA Matthew. See *Styliola minuta*.

CRINOCYSTIS Bather. See *Crinocystites* Hall.

CRINOCYSTITES Hall.

Genotype: *C. chrysalis* Hall.

Crinocystites Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 317, extras, 1864; rev. ed., 1870, p. 361.—Miller, N. A. Geol. Pal., 1889, p. 234.

Crinocystis Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 77.

Crinocystites chrysalis Hall.

Crinocystites chrysalis Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 318, pl. 12a (1), figs. 10, 11; extras, 1864; rev. ed., 1870, p. 362, pl. 12a, figs. 10, 11.

Crinocystis chrysalis Haeckel, Amphorideen u. Cystoideen, 1896, p. 69.

Niagaran (Racine): Racine, Wisconsin.

Crinocystites(?) rectus (Hall).

Crinocystites? rectus Hall, 20th Rep. New York State Nat. Hist., 1868, p. 318 (extras, 1864).

Rhodocrinus(?) rectus Hall, *ibid.*, 1868, p. 379, pl. 10 (1), fig. 2; rev. ed., 1870, p. 368, pl. 11, fig. 10 (pl. 10, fig. 2).

Niagaran (Racine): Racine, Wisconsin.

CRINOSOMA ANTIQUA Castelnau. See *Arthropycus alleghaniensis*.

CRISINELLA GILSENSIS Wiman. See *Protocrisina exigua*.

CROMUS Barrande. See *Encrinurus* Emmrich.

CROMUS ARCTICUS Haughton. See *Encrinurus laevis*.

CROTALOCRINITES Austin and Austin. See *Crotalocrinus* Austin and Austin.

CROTALOCRINUS Austin and Austin. Genotype: *Cyathocrinites rugosus* Miller.

Crotalocrinites Austin and Austin, *Ann. Mag. Nat. Hist.*, 11, 1843, p. 198.

Crotalocrinus Morris, *Cat. British Foss.*, 1st ed., 1848, p. 50.—Muller, *Ann. Mag. Nat. Hist.*, 2d ser., 13, 1854, p. 254.—McCoy, *British Pal. Rocks and Foss.*, 1854, p. 54.—Salter, in Murchison, *Siluria*, 2d ed., 1854, p. 219.—Pictet, *Traité de Pal.*, 2d ed., 4, 1857, p. 312.—Austin, *Cat. Camb. Sil. Foss.*, 1873, p. 123.—Angelin, *Icon. Crinoid.*, 1878, p. 28.—Zittel, *Handb. Pal.*, 1, 1879, p. 356.—DeLoriol, *Pal. Française*, 2, 1882, p. 51.—Carpenter, *Ann. Mag. Nat. Hist.*, 5th ser., 18, 1886, p. 397.—Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1886, pp. 66, 69, (*Rev. Pal.*, pt. 3, sec. 2, pp. 142, 145); 1888, pp. 264–390.—Jaekel, *Zeits. d. d. geol. Gesell.*, 49, 1897, p. 47.—Weller, *Jour. Geol.*, 6, 1898, p. 700.—Bather, *Geol. Mag.*, dec. 4, 5, 1898, p. 327, figs. 1, 3, 4; *Treatise on Zool.*, pt. 3, *Echinoderma*, London, 1900, p. 176, fig. 92, 3.—Weller, *Bull. Chicago Acad. Sci.*, *Nat. Hist. Surv.*, 4, pt. 1, 1900, pp. 19, 141, fig. 52.—Springer, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 216.

CROTALOCRINUS AMERICANUS Weller. See *Crotalocrinus cora*.

Crotalocrinus cora (Hall).

Cyathocrinus cora Hall, *adv. sheets 18th Rep. New York State Cab. Nat. Hist.*, 1865, p. 20, pl. (2), figs. 13, 14; *doc. ed.*, 1867; 20th Rep., 1868, p. 324, pl. 11 (2), figs. 13, 14; *rev. ed.*, 1870, p. 366, pl. 11, figs. 13, 14.—Miller, *Jour. Cincinnati Soc. Nat. Hist.*, 4, 1881, p. 174.—Chamberlin, *Geol. Wisconsin*, 1, 1883, p. 191.—Weller, *Bull. Chicago Acad. Sci.*, *Nat. Hist. Surv.*, 4, pt. 1, 1900, p. 62, pl. 14, figs. 6–10.

Crotalocrinus americanus Weller, *Bull. Chicago Acad. Sci.*, *Nat. Hist. Surv.*, 4, pt. 1, 1900, p. 143, pl. 14, fig. 1.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 561.

Crotalocrinus cora Weller, *Jour. Geol.*, 10, 1902, pp. 532, 534, pl. 3, figs. 1–5.—Slocum, *Field Columbian Mus.*, 2, *Geol. Ser.*, No. 10, 1908, p. 292, pl. 86, figs. 3, 4.

Niagaran (Racine): Racine, Wisconsin; Chicago, etc., Illinois.

Crotalocrinus? vanhornei (Miller).

Cyathocrinus vanhornei Miller, *Jour. Cincinnati Soc. Nat. Hist.*, 4, 1881, p. 261, pl. 6, fig. 3.—Weller, *Bull. Chicago Acad. Sci.*, *Nat. Hist. Surv.*, 4, pt. 1, 1900, p. 64, pl. 14, fig. 5.

Crotalocrinus? vanhornei Weller, *Jour. Geology*, 10, 1902, p. 533 (*gen. ref.*).

Niagaran (Racine): Bridgeport, Illinois.

CRUMENÆCRINITES Troost. See *Periechocrinus* Austin.

CRUMENÆCRINITES OVALIS Troost. See *Periechocrinus tennesseensis*.

CRUZIANA D'Orbigny.

Genotype: *C. rugosa* D'Orbigny.

Cruziana D'Orbigny, *Voyage l'Amerique Merid.*, 3, pt. 4, 1842, p. 30.—Pictet, *Traité de Pal.*, 2d ed., 2, 1854, p. 559.—Salter, *Proc. Geol. Soc. London*, 1860, p. 70; *Mem. Geol. Surv. Great Britain*, 3, 1866, p. 291; 2d ed., 1881, p. 482.—Nathorst, *Kongl. Sven. Vet.-Akad. Handl.*, 18, No. 7, 1881, pp. 33, 87.—James, *Jour. Cincinnati Soc. Nat. Hist.*, 7, 1885, pp. 153–157.—Lebesconte, *Bull. Soc. Geol. France*, 3d ser., 14, 1886, p. 810.—Bornemann, *Nova Acta K. Leop. Carol. Deutsch. Akad. der Natur.*, 51, No. 1, 1886, p. 11.—Nathorst, *Kongl. Sven. Vet.-Akad. Handl.*, 21, No. 14, 1886, p. 16.—Walcott, *Proc. U. S. Nat. Mus.*, 12, 1890, p. 35.—Miller, *N. A. Geol. Pal.*, 1889, p. 115.

Observation.—Possibly the same as *Rusophycus*.

CRUZIANA ASPERA James. See *Rusophycus asper*.

CRUZIANA BILOBATA Hall. See *Rusophycus bilobatus*.

CRUZIANA CARLEYI James. See *Rusophycus carleyi*.

Cruziana cucurbita Salter.

Cruziana cucurbita Salter, Quart. Jour. Geol. Soc. London, 17, 1861, p. 71, pl. 5, figs. 4-6.

Ordovician?: Valleys of Unduavi and Aceromarka, Bolivia.

Cruziana furcifera D'Orbigny.

Cruziana furcifera D'Orbigny, Voyage l'Amerique Merid., 3, pt. 4, 1847, p. 31, 8, Atlas, pl. 1, figs. 2, 3.

Cruziana furcifera Ulrich, Neues Jahrb. f. Min., Geol. Pal., 8, Beilage-Band, 1893, p. 86.

Ordovician: Cochabamba, Bolivia.

CRUZIANA PUDICA James. See *Rusophycus pudicum*.

Cruziana rugosa D'Orbigny.

Cruziana rugosa D'Orbigny, Voyage l'Amerique Merid., 3, pt. 4, 1842, p. 30, 8, Atlas, pl. 1, fig. 1.

Silurian: Cochabamba, Bolivia.

CRUZIANA SUBANGULATA James. See *Rusophycus subangulatus*.

Cruziana unduavi Salter.

Cruziana unduavi Salter, Quart. Jour. Geol. Soc. London, 17, 1861, p. 71, pl. 5, figs. 7, 8.

Ordovician?: Valleys of Aceromarka and Unduavi, Bolivia.

CRYPTOCERAS UNDATUM Chapman. See *Plectoceras halli*.

CRYPTODISCUS Hall. See *Callicrinus* D'Orbigny.

CRYPTOGRAPTUS Lapworth. Genotype: *Diplograptus tricornis* Carruthers.

Cryptograptus Lapworth, Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 174.—Ruedemann, Mem. New York State Mus., 11, pt. 2, pp. 442, 443.

Cryptograptus? antennarius (Hall).

Climacograptus antennarius Hall, Geol. Surv. Canada, dec. 2, 1865, p. 112, pl. 13, figs. 11-13.—Roemer and Frech, Lethaea Pal., 1, 1897, p. 611.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 731-732, pl. 16, figs. 21-26.

Climacograptus antennarius Nicholson, Ann. Mag. Nat. Hist., 4th ser., 6, 1870, p. 382, fig. 6; Mon. Brit. Grapt., 1872, p. 49, fig. 16.

Diplograptus antennarius Nicholson, Quart. Jour. Geol. Soc. London, 24, 1868, p. 139.

Cryptograptus? antennarius Lapworth, Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 174.—Gurley, Jour. Geol., 4, 1896, p. 299 (gen. ref.).—Elles, Quart. Jour. Geol. Soc. London, 54, 1898, p. 519, fig. 31, p. 520.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 443.

Diplograptus laxus Ruedemann, Ann. Rep. New York State Pal., 1902, p. 571; Mem. New York State Mus., 7, pt. 1, 1904, pp. 722, 723, pl. 16, figs. 1-10.

Canadian: Point Levis, Quebec (Levis, *Diplograptus dentatus* zone); Deepkill and Mount Moreno, New York (Deepkill, *D. dentatus* zone); Arkansas; Great Britain.

CRYPTOGRAPTUS MARCIDUS Dodge. See *Cryptograptus tricornis*.

Cryptograptus tricornis (Carruthers).

Diplograptus tricornis Carruthers, Trans. Royal Phys. Soc. Edinburgh, 1, 1858, p. 468, fig. 2; Ann. Mag. Nat. Hist., 3, 1859, p. 25, fig. 2; Geol. Mag., 5, 1868, p. 131, fig. 11.—Hopkinson and Lapworth, Quart. Jour. Geol. Soc. London, 31, 1875, p. 658, fig. 6.—Lapworth, Cat. West Scott. Foss., 1876, fig. 30; Rep. and Proc. Belfast Nat. Field Club, 2d ser., 1, pt. 4, app., 1877, p. 132, pl. 6, fig. 10.—Ami, Rep. Geol. Surv. Canada, 2d ser., 3, pt. 2, 1889, pp. 50K, 117K.

Cryptograptus tricornis Lapworth, Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 171, pl. 5, figs. 27a-27e; Proc. and Trans. Royal Soc. Canada, 4, 1887, p. 177; Science, 9, 1887, p. 320; Canadian Rec. Sci., 3, 1888, p. 141; Rep. Geol. Surv. Canada, 2d ser., 3, pt. 1, 1889, p. 95B.—Gurley, Jour. Geol., 4, 1896, p. 298.—Elles, Quart. Jour. Geol. Soc. London, 54, 1898, p. 527.—Hall, Proc. Royal Soc. Victoria, 18, pt. 1, 1905, p. 21.—Ami, Geol. Surv. Canada, Sum. Rep. for 1904, 1905, p. 12.—Hall, Rec. Geol. Surv. Victoria, 1, pt. 4, 1906, p. 275.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 443-448, pl. 28, figs. 1-4; figs. 410-417.

Cryptograptus (*Idiograptus*) *tricornis*, Perner, Etudes sur les Grapt. Boheme, pt. 2, 1895, p. 26, pl. 7, figs. 7-10.

Diplograptus etheridgii Hopkinson, Geol. Mag., 9, 1872, p. 504, fig. 5.

Graptolithus marcidus Hall, Pal. New York, 3, 1859, p. 515, figs. 1-3; 13th Ann. Rep. New York State Cab. Nat. Hist., 1860, pp. 58, 59, figs. 1-3.

Diplograptus marcidus Walcott, Trans. Albany Inst., 10, 1883 (adv. sheet 1879, p. 34).—Whitfield, Amer. Jour. Sci., 3d ser., 26, 1883, p. 380.—Walcott, Bull. Geol. Soc. Amer., 1, 1890, p. 339.

Cryptograptus marcidus Dodge, Amer. Jour. Sci., 3d ser., 40, 1890, p. 153.

Middle Ordovician: South Scotland (Glenkiln and Hartfell); New York slate belt (Normanskill); Canada; Tennessee; Arkansas; Australia; Bohemia; etc.

Cryptograptus tricornis insectiformis Ruedemann.

Cryptograptus tricornis mut. *insectiformis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 448, 449, pl. 28, figs. 5, 419-422.

Trenton (Snake Hill): Van Schaick Island, Cohoes, New York

CRYPTOLITHUS Green.

Genotype: *C. tessellatus* Green.

Cryptolithus Green, Mon. Tril. N. Amer., 1832, p. 72.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, pp. 540-542.—Emmrich, *ibid.*, 1845, p. 44.—Hall, Pal. New York, 1, 1847, p. 235, footnote.

Nuttainia Eaton, Geol. Textb., 2d ed., 1832, p. 33.—Green, Mon. Tril. N. Amer., 1832, p. 88.—Hall, Pal. New York, 1, 1847, p. 235, footnote.—Reed, Quart. Jour. Geol. Soc. London, 58, 1902, p. 62.

Trinucleus Murchison, Sil. Syst., 1839, p. 659.—Emmons, Nat. Hist. New York, Geol., 2, 1842, p. 115.—Salter, Quart. Jour. Geol. Soc. London, 3, 1847, p. 251.—Hawle and Corda, Abh. d. k. bohml. Gesell. Wiss., 5 (extract), 1847, p. 38, pl. 3, fig. 17.—Salter, Mem. Geol. Surv. United Kingdom, dec. 7, 1853, pl. 7.—McCoy, Brit. Pal. Rocks and Foss., 1854, p. 144.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 508.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 212.—Chapman, Canadian Jour., n. s., 1, 1856, p. 273; 8, 1863, p. 28; Expos. Min. Geol. Canada, 1864, p. 136.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 126.—Zittel, Handb. Pal., 2, 1885, p. 593.—Miller, N. A. Geol. Pal., 1889, p. 568.—Beecher, Amer. Jour. Sci., 3d ser., 46, 1893, p. 143.—Vogdes, Cal. Acad. Sci., Occ. Pap., 4, 1893, p. 359.—Beecher, Amer. Jour. Sci., 3d ser., 49, 1895, p. 307; Amer. Geol., 16, 1895, pp. 167, 176.—Koken, Die Leitfossilien, Leipzig, 1896, p. 15, fig. 9, 1.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, pp. 105, 184, 186, pl. 3, fig. 12.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 258.

Cryptolithus bellulus (Ulrich).

Trinucleus bellulus Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 99, pl. 4, fig. 15.

Eden: Covington, Kentucky, and vicinity (Economy); New York (Indian Ladder).

Holotype.—Cat. No. 41876, U.S.N.M.

Cryptolithus bigebii Green.

Not recognized.

Cryptolithus Bigebii Green, Mon. Tril. N. Amer. 1832, p. 76.

Ordovician: Montmorency, near Quebec, Ontario.

Cryptolithus boliviensis (Lake).

Trinucleus boliviensis Lake, Quart. Jour. Geol. Soc. London, 62, 1906, p. 427, pl. 40, figs. 4, 5.

Ordovician: Near Apolo, Bolivia.

Cryptolithus kruegeri (Hoek).

Trinucleus kruegeri Hoek, Neues Jahrb. Min., Geol., Pal., 34, 1912, p. 236, pl. 10, figs. 7, 8.

Ordovician: Cochabamba, Bolivia.

Cryptolithus tessellatus Green.

Cryptolithus tessellatus Green, Mon. Tril. North Amer., 1832, p. 73, cast 38, pl. 1, fig. 4; Monthly Amer. Jour. Sci., 1, 1832, pl. 1, fig. 4.—Conrad, Amer. Jour. Sci., 38, 1840, p. 91, footnote.—Vanuxem, Nat. Hist. New York, Geol., 3, 1842, p. 48.—Locke, Proc. Acad. Nat. Sci. Philadelphia, 1, 1842, pp. 196, 236, fig.—Rouault, Bull. Soc. Geol. France, 2d ser., 6, 1849, p. 83.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1910, p. 78 (gives history of genus and species); 17, 1914, p. 317.

Trinucleus tessellatus Emmons, Nat. Hist. New York, Geol., 2, 1842, pp. 115, 390, 391, fig. 7.—Owen, Amer. Jour. Sci., 47, 1844, pp. 363, 364, fig. 7.

Nuttainia concentrica Eaton, Geol. Textb., 2d ed., 1832, p. 34, pl. 1, fig. 2.—Green, Mon. Tril. North Amer., 1832, p. 76.

Trinucleus caractaci Emmons, Nat. Hist. New York, Geol., 2, 1842, p. 403, fig. 1.—Owen, Amer. Jour. Sci., 47, 1844, p. 377, 378.—De Verneuil, *ibid.*, 2d ser., 7, 1849, p. 223.—Emmons, Man. Geol., 1860, p. 103, fig. 93.

Trinucleus concentricus Hall, Pal. New York, 1, 1847, p. 249, pl. 65, figs. 4a, c; p. 255, pl. 67, figs. 1a–h.—Salter, Mem. Geol. Surv. United Kingdom, dec. 7, 1853, p. 51, pl. 7.—Emmons, Amer. Geol., 1, pt. 2, 1855, p. 212, pl. 15, fig. 4a, b; pl. 16, fig. 7; pl. 17, fig. 1.—Chapman, Canadian Jour., n. s., 1, 1856, p. 273; 3, 1858, p. 514, fig.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 820, fig. 611.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 47, pl. 3, fig. 5; pl. 4, fig. 12.—Hitchcock, Geol. Vermont, 1, 1861, p. 300, fig. 215.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 190, fig. 191a, b.—Chapman, Canadian Jour., n. s., 8, 1863, p. 28, fig. 139; p. 200, fig. 195; Expos. Min. Geol. Canada, 1864, p. 136, fig. 139; p. 172, fig. 195.—Salter, Mem. Geol. Surv. Great Britain, 3, 1866, p. 320, pl. 19, fig. 4; Cat. Camb. Sil. Foss., 1873, p. 49.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 126.—Walcott, Bull. Mus. Comp. Zool., 8, 1881, p. 199.—Salter, Mem. Geol. Surv. Great Britain, 3, 2d ed., 1881, p. 517, pl. 19, fig. 4.—Miller, N. A. Geol. Pal., 1889, p. 569, fig. 1063.—Leeley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1223, fig.—Beecher, Amer. Jour. Sci., 3d ser., 49, 1895, p. 309, pl. 3, figs. 1–6.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 192, pl. 14, figs. 3, 4.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1064, pl. 44, fig. 11.—Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, pl. 7, fig. 3.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 259, fig. 1547.

Cryptolithus tessellatus—Continued.

Trenton-Maysville: Glens Falls, near Waterford, etc., New York; Canada; Pennsylvania; New Jersey; Ohio; Kentucky; Oklahoma; Virginia; etc.
Plastotype.—Cat. No. 4921, U.S.N.M.

CRYPTONYMUS Eichwald. See *Asaphus Brongniart* and *Encrinurus Emmrich*.

CRYPTOPHRAGMUS Raymond. Genotype: *C. antiquatus* Raymond.
Cryptophragmus Raymond, Bull. Victoria Mem. Mus., 5, 1914, p. 8.

Cryptophragmus antiquatus Raymond.

Cryptophragmus antiquatus Raymond, Bull. Victoria Mem. Mus., 5, 1914, p. 8, pls. 1-4.
 Black River (Lowville): Carden, etc., Ontario; Quebec; New York.

CRYPTOPORA Nicholson. See *Semicoscinium* Prout.

CRYPTOZOON Hall. Genotype: *C. proliferum* Hall.

Cryptozoon Hall, 36th Rep. New York State Mus. Nat. Hist., 1884, expl. of pl. 6.—Miller, N. A. Geol. Pal., 1889, p. 157.—Dawson, Canadian Rec. Sci., 7, 1896, p. 204.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 46.—Seely, Rep. State Geol. Vermont, 5, 1906, p. 160.—Walcott, Smiths. Misc. Coll., 57, 1912, p. 257.—Wieland, Bull. Amer. Mus. Nat. Hist., 33, 1914, p. 239.

Cryptozoon bassleri Wieland.

Cryptozoon bassleri Wieland, Bull. Amer. Mus. Nat. Hist., 33, 1914, p. 239, figs. 1, 2, pls. 14-18.
 Upper Cambrian or Ozarkian: Near Pennsylvania State College, Center County, Pennsylvania.

Cryptozoon boreale Dawson.

Cryptozoon boreale Dawson, Canadian Rec. Sci., 7, 1896, p. 207, fig. 1.
 Trenton: Lake St. John, Quebec.

Cryptozoon giganteum Chaney.

Cryptozoon giganteum Chaney, Bull. Minnesota Acad. Nat. Sci., 3, 1891, p. 223.
 Canadian (Shakopee): Northfield, Minnesota.

Cryptozoon lachutense Dawson.

Cryptozoon lachutense Dawson, Canadian Rec. Sci., 7, 1896, p. 206.—Seely, Rep. State Geol. Vermont, 5, 1906, p. 168.
 Canadian (Beekmantown): Lachute, Quebec.

Cryptozoon minnesotense Winchell.

Cryptozoon minnesotense Winchell, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 313, pl. 1, figs. 1, 2; pl. 2, fig. 3.—Chaney, Bull. Minnesota Acad. Nat. Sci., 3, 1891, p. 230.—Dawson, Canadian Rec. Sci., 7, 1896, p. 206.
 Canadian (Shakopee): Cannon Falls, Northfield, and Mankato, Minnesota.

Cryptozoon minnesotense libertatis Winchell.

Cryptozoon minnesotense var. *libertatis* Winchell, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 315, pl. 2, fig. 4.
 Canadian (Shakopee): Northfield, Minnesota.

Cryptozoon perkinsi Seely.

Cryptozoon? *perkinsi* Seely, Rep. State Geol. Vermont, 4, 1904, p. 150.
 Chazy: Isle la Motte, Vermont.

Cryptozoon proliferum Hall.

Cryptozoon proliferum Hall, 36th Rep. New York State Mus. Nat. Hist., 1884, pl. 6.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 163, fig.—Dawson, Canadian Rec. Sci., 7, 1896, p. 204, fig. 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 46.—Seely, Rep. State Geol. Vermont, 5, 1906, p. 161.—Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, p. 155, pl. 18, fig. 2.—Wieland, Bull. Amer. Mus. Nat. Hist., 33, 1914, p. 244, fig. 2.—Walcott, Smiths. Misc. Coll., 57, 1912, p. 258, pl. 37, figs. 1-3.

Upper Cambrian or Ozarkian: Saratoga and Herkimer Counties, New York (Hoyt); Pennsylvania; Maryland; Virginia (Conococheague).

Plesiotype.—Cat. Nos. 56629, 58541, 58543, U.S.N.M.

Cryptozoon saxiroseum Seely.

Cryptozoon saxiroseum Seely, Rep. State Geol. Vermont, 5, 1906, p. 162, pls. 36, 37, figs. 3-6.—Perkins, Rep. State Geol. Vermont, 8, 1912, pl. 16.

Canadian (Beekmantown): Beekmantown, New York.

Cryptozoon steeli Seely.

Cryptozoon steeli Seely, Rep. State Geol. Vermont, 5, 1906, p. 161, pls. 34, 36, 43, fig. 1.

Canadian (Beekmantown): Clinton County, New York; Pennsylvania; Maryland.

Cryptozoon wingi Seely.

Cryptozoon wingi Seely, Rep. State Geol. Vermont, 5, 1906, p. 163, pl. 38.

Canadian (Beekmantown): Mount Independence, Orwell County, Vermont.

CRYSTALLOCYSTIS AURANTIUM Haeckel. See *Echinosphærites aurantium*.

CTENOBOLBINA Ulrich.

Genotype: *Beyrichia ciliata* Emmons.

Ctenobolbina Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 108.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 706.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 673.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 309.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 19, 1900, p. 180.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 309.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1040.—Bonnema, Mitt. Min. Geol. Inst. Groningen, 2, 1909, p. 43.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 353.

Ctenobolbina alata Ulrich.

Ctenobolbina alata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 110, pl. 7, figs. 4a-c.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 282, fig. 6, pl. 40, figs. 6-8.

Eden (McMicken): Cincinnati, Ohio, and vicinity.

Cotypes.—Cat. No. 41489, U.S.N.M.

Ctenobolbina bispinosa Ulrich.

Ctenobolbina bispinosa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 110, pl. 7, fig. 6.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 40, fig. 9.

Eden (McMicken): Cincinnati, Ohio, and vicinity.

Holotype.—Cat. No. 41490, U.S.N.M.

Ctenobolbina ciliata (Emmons).

Beyrichia ciliata Emmons, Amer. Geology, 1, pt. 2, 1855, p. 219, fig. 74c.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 351.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 89, fig.—Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 19, pl. 3, figs. 12-16; pl. 4, figs. 16-18.

Ctenobolbina ciliata—Continued.

Ctenobolbina ciliata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 108, pl. 7, figs. 1a, b.—Ruedemann, Bull. New York State Mus., 42, Pal., 8, 1901, p. 575, pl. 2, figs. 8, 9.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 282, fig. 7, pl. 40, figs. 1, 2.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 353, fig. 1660, t, t'.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 738, fig. 1425e.

Beyrichia tumifrons Hall, Desc. n. sp. Fossils, Cincinnati, Ohio, 1871, p. 7, pl. 4, fig. 11; 24th Rep. New York State Mus. Nat. Hist., 1872, p. 231, pl. 8, fig. 11.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 119.—Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 102, pl. 4, fig. 8.

Eden: Cincinnati, Ohio, and vicinity.

Trenton (Snake Hill): Green Island, Albany County, New York.

Plesiotypes.—Cat. No. 41492, U.S.N.M.

Ctenobolbina ciliata cornuta Ruedemann.

Ctenobolbina ciliata cornuta Ruedemann, Bull. New York State Mus., 42, Pal., 1901, p. 575, pl. 2, figs. 5-7.

Trenton (Snake Hill): Mechanicsville, Saratoga County, and Green Island, Albany County, New York.

CTENOBOLBINA CILIATA VAR. *CURTA* Ulrich. See *Ctenobolbina curta*.

CTENOBOLBINA CILIATA VAR. *EMACIATA* Ulrich. See *Ctenobolbina emaciata*.

CTENOBOLBINA CILIATA VAR. *HAMMELLI* Cummings. See *Ctenobolbina hammelli*.

Ctenobolbina crassa (Ulrich).

Jonesella crassa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 123, pl. 7, figs. 11a-c.

Ctenobolbina crassa Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 675, pl. 44, figs. 12-16.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 40, figs. 15, 16.

Black River (Decorah): Minneapolis, Cannon Falls, etc., Minnesota.

Cotypes.—Cat. No. 41497, U.S.N.M.

Ctenobolbina curta (Ulrich).

Ctenobolbina ciliata var. *curta* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 109, pl. 7, fig. 2.

Ctenobolbina curta Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 310.

Eden (McMicken): Cincinnati, Ohio, and vicinity.

Ctenobolbina denticula Ulrich and Bassler.

Ctenobolbina? *denticula* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 524, pl. 96, figs. 6-9.

Helderbergian (Keyser): Cumberland, Maryland.

Holotype.—Cat. No. 43307, U.S.N.M.

Ctenobolbina? *dubia* Ulrich and Bassler.

Ctenobolbina? *dubia* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 525, pl. 96, figs. 10-12.

Helderbergian (Keyser): Cumberland, Maryland.

Holotype.—Cat. No. 53277, U.S.N.M.

Ctenobolbina duryi (Miller).

Beyrichia duryi Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 232, figs. 24, 25.—

Miller, N. A. Geol. Pal., 1889, p. 534, figs. 976, 977.

Ctenobolbina duryi Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 108.

Maysville (McMillan): Cincinnati, Ohio, and vicinity.

Ctenobolbina emaciata (Ulrich).

Ctenobolbina ciliata var. *emaciata* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 109, pl. 7, figs. 3a-c.

Ctenobolbina emaciata Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 310, pl. 40, figs. 3-5.

Richmond (Maquoketa): Savannah, Illinois.

Holotype.—Cat. No. 41325, U.S.N.M.

Ctenobolbina fulcrata Ulrich.

Ctenobolbina fulcrata Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 674, pl. 44, figs. 8-11.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 297, fig. 40, pl. 40, figs. 13, 14.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 353, fig. 1660, r, r', s.

Black River (Decorah): St. Paul, Minnesota.

Cotypes.—Cat. No. 41322, U.S.N.M.

Ctenobolbina hammelli (Miller and Faber).

Beyrichia hammelli Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 156, pl. 8, fig. 26.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 787, fig. 1453.

Ctenobolbina hammelli Ulrich and Bassler, Proc. U. S. Nat. Mus. 35, 1908, p. 310.

Ctenobolbina ciliata var. *hammelli* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1045, pl. 53, fig. 6.

Richmond (Arnheim-Waynesville): Versailles, etc., Indiana; Lebanon, etc., Ohio.

Ctenobolbina obliqua Ulrich.

Ctenobolbina obliqua Ulrich, Jour. Cincinnati Soc. Nat. Hist., 19, 1900, p. 180, pl. 8, fig. 4.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 40, fig. 10.

Trenton (Prosser): Kenyon, Minnesota.

Holotype.—Cat. No. 41328, U.S.N.M.

Ctenobolbina punctata Ulrich.

Ctenobolbina punctata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 186, pl. 12, figs. 5a-c.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 40, figs. 19, 20.

Clinton (Rochester): Lockport, etc., New York; Grimsby, Ontario.

Holotype.—Cat. No. 41578, U.S.N.M.

Ctenobolbina subcrassa Ulrich.

Ctenobolbina subcrassa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 19, 1900, p. 180, pl. 8, figs. 1-3.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 293, fig. 27; p. 297, fig. 42, pl. 40, figs. 17, 18.

Stones River (Ridley): High Bridge, Kentucky.

Cotype.—Cat. No. 41316, U.S.N.M.

Ctenobolbina subrotunda Ruedemann.

Ctenobolbina subrotunda Ruedemann, Bull. New York State Mus., 42, Pal., 1901, p. 576, pl. 2, figs. 1-4.

Trenton (Snake Hill): Port Schuyler, New York.

CTENOBOLBINA TUMIDA Ulrich. See *Beyrichia tumida*.

CTENOCRINUS LEVIS Roemer. See *Melocrinus roemeri*.

CTENOCRINUS ORNATUS Hall. See *Macrostylocrinus ornatus*.

CTENOCRINUS STRIATUS Hall. See *Macrostylocrinus striatus*.

CTENODONTA Salter.Genotype: *Tellinomya nasuta* Hall.

Nucula Hall (not Lamarck), Geol. Rep. 4th Dist. New York, 1842, p. 76. Amer. Jour. Sci., 48, 1843, p. 292; Pal. New York, 1, 1847, pp. 150, 316.

Lyrodosma Hall (part), Pal. New York, 1, 1847, p. 302.

Ctenodonta Salter, Rep. British Assoc. Adv. Sci., 1851, p. 63; Rep. 21st Meeting, British Assoc. Adv. Sci., Notes and Abstracts, 1852, p. 64; Geol. Surv. Canada, dec. 1, 1859, p. 34.—Winchell, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 128-129.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 308.—Zittel, Handb. d. Pal., 2, 1881, p. 51.—Lesley, Proc. Geol. Assoc. London, 10, 1888, p. 395.—Barrois, Ann. Soc. Geol. Nord, 19, Lille, 1891, p. 184.—Ulrich, Geol. Surv. Ohio, 7, 1893, p. 679; Geol. Minnesota, 3, pt. 2, 1894, p. 578.—Whidborne, Mon. Dev. Fauna South England, 3, Pal. Soc., 1896, p. 98.—Koken, Die Leitfossilien, Leipzig, 1896, p. 194.—Hind, Mon. British Carb. Lamellibranchiata, 1, Pal. Soc., 1897, pp. 177, 209.—Dall, Zittel-Eastman Textb. Pal., 1, 1900, p. 363.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 979.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 393.—Dall, Zittel-Eastmann Textb. Pal., 2d ed., 1913, p. 440.

Tellinomya Hall, Pal. New York, 1, 1847, p. 151.—Pictet, Traite de Pal., 2d ed., 3, 1855, p. 534.—Hall, Canadian Nat. Geol., 1, 1856, p. 391; 10th Rep. New York State Cab. Nat. Hist., 1857, pp. 181, 182, (extr., pp. 141, 142); Amer. Jour. Sci. and Arts, 2d ser., 25, 1858, p. 108; Pal. New York, 3, 1859, p. 14, footnote; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 76.—Hitchcock, Geol. Vermont, 1, 1861, p. 295.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, pp. 228, 229.—Salter, Mem. Geol. Surv. Great Britain, 2d ed., 1881, p. 550.—Koninck, Ann. d. Mus., Royal d'Hist. Nat. de Belgique, 11, 1885, p. 138.—Miller, N. A. Geol. Pal., 1889, p. 514.—Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, pp. 148-150.—Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 73.—Hind, Mon. British Carb. Lamellibranchiata, 1, Pal. Soc., 1897, p. 177 (Genotype: *T. nasuta* Hall).

Not *Tellinomya*, the correct form of *Tellimya* Brown, 1827, as given by Agassiz in his "Nomenclator Zoologicus" in 1846.

Palaeoconcha Miller, N. A. Geol. Pal., 1889, p. 498 (Genotype: *P. faberi* Miller).

Ctenodonta abrupta Billings.

Ctenodonta abrupta Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 46, figs. 48a-c (adv. sheets, 1862); Geol. Canada, Geol. Surv. Canada, 1863, p. 143, figs. 79a-c; p. 175, figs. 161a-b.

Tellinomya abrupta Miller, N. A. Geol. Pal., 1889, p. 514 (gen. ref.).

Black River (Leray): Pauquettes Rapids, Ottawa River, Canada.

Ctenodonta? absimilis (Sardeson).

Tellinomya absimilis Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 74, pl. 3, figs. 1, 2.

St. Peter: Highland Park, Minnesota.

Ctenodonta albertina Ulrich.

Ctenodonta albertina Ulrich, Geol. Minnesota, 3, 1894, p. 598, pl. 42, figs. 76-82.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394, fig. 502m.

Richmond (Waynesville): Clarksville, etc., Ohio,

Cotypes.—Cat. No. 46122, U.S.N.M

Ctenodonta alta (Hall).

Tellinomya alta Hall. Rep. Geol. Surv. Wisconsin, 1861, p. 27.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 309, pl. 2, figs. 6a, b.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 50, pl. 6, figs. 5-8.

Ctenodonta alta—Continued.

- Ctenodonta alta* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 602, pl. 42, figs. 93, 94.—
Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394, fig. 502k-l.
Trenton: Mount Carrol, Illinois; Dodgeville, Wisconsin (Galena); Fountain, Minnesota (Prosser).
Plesiotype.—Cat. No. 46123, U.S.N.M.

Ctenodonta angela Billings.

- Ctenodonta Angela* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 221, fig. 203.
Tellinomya Angela Miller, N. A. Geol. Pal., 1889, p. 514 (gen. ref.).
Chazyan (Quebec—M): Table Head, Newfoundland.

Ctenodonta? angustata (Hall).

- Tellinomya angustata* Hall, Canadian Nat. Geol., 5, 1860, p. 152.
Silurian: Arisaig, Nova Scotia.

Ctenodonta astarteiformis Salter.

- Ctenodonta astarteiformis* Salter, Geol. Surv. Canada, dec. 1, 1859, p. 39, pl. 8, figs. 7, 7a.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 175, figs. 164 a, b.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 184 (loc. ccc.).—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394.
Ctenodonta cf. astarteiformis Ruedemann, Bull. New York State Mus., 49, 1901, p. 28.
Tellinomya astarteiformis Miller, N. A. Geol. Pal., 1889, p. 515 (gen. ref.).
Black River: Allumette Island, Ottawa River, Canada (Leray); Lake Winnipeg, Manitoba.

Ctenodonta? attenuata (Hall).

- Tellinomya attenuata* Hall, Canadian Nat. Geol., 5, 1860, p. 151.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1164.
Silurian: Arisaig, Nova Scotia.

Ctenodonta auburnensis Branson.

- Ctenodonta auburnensis* Branson, Trans. Acad. Sci. St. Louis, 18, No. 4, 1909, p. 40, pl. 7, figs. 2-4.
Black River (Auburn-Decorah): Lincoln County, Missouri.

Ctenodonta baffinensis Ulrich.

- Ctenodonta baffinensis* Ulrich in Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 161, pl. 13, figs. 7-10.
Mohawkian: Head of Frobisher Bay, Baffin Land.

Ctenodonta bidorsata Raymond.

- Ctenodonta? bidorsata* Raymond, Ann. Carnegie Mus., 3, 1906, p. 577.
Chazyan (Crown Point): Valcour Island, New York.

Ctenodonta calvini Ulrich.

- Ctenodonta calvini* Ulrich, Geol. Minnesota, 3, 1894, p. 596, pl. 42, figs. 61-64.—
Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394, fig. 502n.
Tellinomya calvini Miller, N. A. Geol. Pal., 1897, p. 785 (gen. ref.).
Richmond (Maquoketa): Graf, etc., Iowa; Scales Mound, Illinois.
Cotypes.—Cat. No. 46124, U.S.N.M.

Ctenodonta candens (Sardeson).

- Tellinomya candens*, Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 339, pl. 6, fig. 24; p. 343.
Black River (Decorah): Minneapolis, Minnesota.

Ctenodonta carinata Ulrich.

Ctenodonta carinata Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 589, pl. 42, figs. 41-43.

Tellinomya carinata Miller, N. A. Geol. Pal., 2d App., 1897, p. 785 (gen. ref.).

Trenton (Prosser): East of Fountain, Minnesota.

Cotypes.—Cat. No. 46124, U.S.N.M.

Ctenodonta carpenderi Schuchert.

Ctenodonta carpenderi Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 160, pl. 13, figs. 1-3.

Mohawkian: Head of Frobisher Bay, Baffin Land.

Cotypes.—Cat. No. 28164, U.S.N.M.

Ctenodonta cingulata (Ulrich).

Tellinomya cingulata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 23, pl. 7, figs. 19, 19a.

Ctenodonta cingulata Ulrich, Geol. Surv. Ohio, 7, 1893, p. 680, pl. 48, figs. 10-12.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 997, pl. 44, figs. 5, 5a.

Richmond: Marble Hill, near Madison, Indiana; Dayton, Ohio; Boyle and Oldham Counties, Kentucky.

Holotype and *plesiotypes*.—Cat. Nos. 46126, 46127, U.S.N.M.

Ctenodonta clarkel Bassler (new name).

Tellinomya pulchella Clarke (not Hall, 1856), Archivos Mus. Nac. Rio de Janeiro, 10, author's Engl. ed., 1900, p. 17, pl. 2, figs. 13-15.

Silurian: Rio Trombetas, Brazil.

Ctenodonta clintonensis (Foerste).

Tellinomya (Nucula?) *clintonensis* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 563, pl. 37, fig. 15.

Clinton: Near Mifflintown, Juniata County, Pennsylvania.

Ctenodonta compressa (Ulrich).

Tellinomya compressa Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1892, p. 216, fig. 2.

Ctenodonta compressa Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 600, pl. 37, fig. 29; pl. 42, figs. 88-90.

Black River (Decorah): Goodhue County, Minnesota.

Holotype and *plesiotypes*.—Cat. No. 46128, U.S.N.M.

Ctenodonta contracta Salter.

Ctenodonta contracta Salter, Geol. Surv. Canada, dec. 1, 1859, p. 37, pl. 8, figs. 4, 5.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 175, fig. 160a, b.

Tellinomya contracta Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 76, pl. 11, 1884, figs. 15, 15a.

Tellinomya cuneata Hall, 10th Rep. New York State Cab. Nat. Hist., 1857, p. 183 (ext., p. 143), figs. 6, 7 (not described; probably in error for *contracta*); Rep. Geol. Surv. Wisconsin, 1862, p. 38, figs. 1, 2.

Black River (Leray): Pauquettes Rapids, Ottawa River, etc., Canada.

Upper Pogonip: Eureka and White Pine Districts, Nevada.

Plesiotype.—Cat. No. 17284, U. S. N.M. (Walcott).

Ctenodonta costata Branson.

Ctenodonta costata Branson, Trans. Acad. Sci. St. Louis, 18, No. 4, 1909, p. 40, pl. 7, figs. 7, 8.

Black River (Auburn-Decorah): Lincoln County, Missouri.

Ctenodonta cuneiformis Ulrich.

Ctenodonta cuneiformis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 587, pl. 42, figs. 31-33.

Tellinomya cuneiformis Miller, N. A. Geol. Pal., 1897, p. 785 (gen. ref.).

Black River (Decorah): Six miles south of Cannon Falls, Minnesota.

Cotypes.—Cat. No. 46129, U.S.N.M.

Ctenodonta curta (Hall).

Tellinomya curta Hall, Pal. New York, 2, 1852, p. 86, pl. 27, figs. 10, 13.

Lower Clinton: Wolcott, Wayne County, New York.

Ctenodonta declivis Ruedemann.

Ctenodonta declivis Ruedemann, Bull. New York State Mus., 162, 1912, p. 101, pl. 6, figs. 2, 3.

Trenton (Snake Hill): Snake Hill, Saratoga County, New York.

Ctenodonta diminuens (Simpson).

Tellinomya (Palæoneilo) diminuens Simpson, Trans. Amer. Philos. Soc., n. s., 16, 1889, p. 453, fig. 22.—Simpson in Lesley Geol. Surv. Pennsylvania, Rep.

P 4, 1890, p. 1165, fig.

Tellinomya cuneata Simpson in Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1164, fig.

Tellinomya (Palæoneilo) cuneata Simpson, Trans. Amer. Philos. Soc., n. s., 16, 1889, p. 453, fig. 21.

Clinton: Near Lewistown and Orbisonia, Pennsylvania.

Ctenodonta donaciformis (Hall).

Nucula? donaciformis Hall, Pal. New York, 1, 1847, p. 316.

Tellinomya donaciformis Hall, Canadian Nat. Geol., 1, 1856, p. 395 (gen. ref.).

Ctenodonta donaciformis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 581 (gen. ref.).

Trenton: Middleville, New York.

Ctenodonta dubia (Hall).

Tellinomya dubia Hall, Pal. New York, 1, 1847, p. 153, pl. 34, figs. 6a-f; Canadian Nat. Geol., 1, 1856, p. 392, figs. 4, 5.—Lesley, Geol. Surv. Pennsylvania, Rep.

P 4, 1890, p. 1165, figs.

Lyonsia dubia Emmons, Amer. Geology, 1, pt. 2, 1855, p. 170, pl. 14, figs. 7, 8, 12, 13.

Ctenodonta dubia Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 175, fig. 163a, b.

Trenton: Middleville, Watertown, Trenton Falls, etc., New York.

Ctenodonta dubiaformis Raymond.

Ctenodonta dubiaformis Raymond, Amer. Jour. Sci., 20, 1905, p. 371.

Chazy (Crown Point): Sloop Bay, Valcour Island, New York.

Ctenodonta elliptica (Hall).

Tellinomya elliptica Hall, Pal. New York, 2, 1852, p. 102, pl. 30, fig. 4b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1165, fig.—Foerste, Geol. Surv.

Ohio, Pal., 7, 1893, p. 562, pl. 37, figs. 4a-c.

Upper Clinton: Near Mohawk, New York.

Upper Medinan (Brassfield): Todds Fork near Wilmington, Ohio.

Ctenodonta equilatera (Hall).

Tellinomya? equilatera Hall, Pal. New York, 2, 1852, p. 330, pl. 75, fig. 1a-d.—

Grabau, Bull. New York State Mus., 92, 1906, p. 109, fig. 15.

Ctenodonta equilatera—Continued.

Tellinomya (*Ctenodonta*) *equilatera* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 520 (gen. ref.).

Ctenodonta equilatera Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 395. Cayugan (Cobleskill): Schoharie, New York.

Ctenodonta fecunda (Hall).

Nucula (*Tellinomya*) *fecunda* Hall, Geol. Surv. Wisconsin, 1, 1862, p. 55, fig. 1.

Ctenodonta fecunda Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 595, pl. 42, figs. 67-73.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394, fig. 502g-h.

Richmond (Maquoketa): Dubuque, Iowa; Scales Mound, Illinois; Wisconsin; Minnesota.

Plesiotypes.—Cat. No. 46130, U.S.N.M.

Ctenodonta filistriata Ulrich.

Tellinomya levata Hall and Whitfield (not Hall, 1847), Pal. Ohio, 2, 1875, p. 82.

Ctenodonta filistriata Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 599, fig. 44a-e.

Eden: Covington, Kentucky, and vicinity.

Cotypes.—Cat. No. 46131, U.S.N.M.

Ctenodonta frobisherensis Schuchert.

Ctenodonta frobisherensis Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 161, pl. 13, figs. 11-14.

Mohawkian: Head of Frobisher Bay, Baffin Land.

Cotypes.—Cat. No. 28165, U.S.N.M.

Ctenodonta gibberula Salter.

Ctenodonta gibberula Salter, Canadian Org. Rem., dec. 1, 1857, p. 38, pl. 8, fig. 6.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 587, pl. 42, fig. 37; fig. 44f-g, p. 599.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 393, fig. 502c-d.

Tellinomya ventricosa Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 27; Rep. Geol. Surv. Wisconsin, 1862, p. 38, fig. 4.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 307, pl. 2, figs. 7a-c.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 156.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 51, pl. 6, figs. 1-4.

Black River: Pauquette Rapids, etc., Canada (Leray), Beloit, Wisconsin; Minnesota; Illinois; Iowa; etc.

Stones River (Murfreesboro): Murfreesboro, Tennessee.

Plesiotype.—Cat. No. 46132, U.S.N.M.

Ctenodonta gibbosa (Hall).

Tellinomya gibbosa Hall, Pal. New York, 1, 1847, p. 153, pl. 34, figs. 5a,b.—Leahey, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1168, figs.

Tellinomya (*Ctenodonta*) *gibbosa* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 520 (gen. ref.).

Lyonsia gibbosa Emmons, Amer. Geology, 1, pt. 2, 1855, p. 170, pl. 14, fig. 3.

Ctenodonta gibbosa Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 176, fig. 165.

Trenton: Middleville, New York.

Ctenodonta hamburgensis (Walcott).

Tellinomya Hamburgensis Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 76, pl. 11, figs. 1, 1a.

Ctenodonta hamburgensis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 605, pl. 42, figs. 91, 92.

Upper Pogonip: Eureka District, Nevada.

Black River (Decorah): Chatfield, Minnesota.

Holotype and *plesiotype*.—Cat. Nos. 17286, 46133, U.S.N.M.

***Ctenodonta hartsvillensis* Safford.**

Ctenodonta hartsvillensis Safford, Geol. Tennessee, 1869, p. 287, pl. 2 (F), figs. 3a-f.

Tellinomya (*Ctenodonta*) *hartsvillensis* Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1168, figs.

Trenton: Hartsville, etc., Tennessee (Catheys); Kentucky (Flanagan).

***Ctenodonta? hilli* (Miller).**

Tellinomya hilli Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 230, fig. 20; N. A. Geol. Pal., 1889, p. 515, fig. 931.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1021, pl. 48, fig. 6.

Ctenodonta? hilli Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 581 (gen. ref.).

Richmond (Whitewater-Saluda): Near Osgood, Indiana.

***Ctenodonta inflata* (Hall).**

Tellinomya inflata Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 26; 1862, p. 38, figs. 4, 5.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 49, pl. 6, figs. 10-12.

Black River (Platteville): Mineral Point, Wisconsin.

***Ctenodonta intermedia* (Ulrich).**

Tellinomya intermedia Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1892, p. 218, text fig. 4.

Ctenodonta intermedia Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 601, pl. 42, figs. 95-97.

Trenton (Prosser): Wykoff, etc., Minnesota.

Cotypes.—Cat. No. 46134, U.S.N.M.

***Ctenodonta iphigenia* Billings.**

Ctenodonta Iphigenia Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 216, fig. 221; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 152, fig. 132 (adv. sheets 1862).

Tellinomya Iphigenia Miller, N. A. Geol. Pal., 1889, p. 515 (gen. ref.).

Richmond: Cape Smyth, Lake Huron.

***Ctenodonta jerseyensis* Weller.**

Ctenodonta jerseyensis Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 164, pl. 11, fig. 17.

Black River (Jacksonburg): Jacksonburg, New Jersey.

***Ctenodonta? lata* (Hall).**

Tellinomya lata Hall, Pal. New York, 2, 1852, p. 85, pl. 27, fig. 7.

Clinton: Wolcott, New York.

***Ctenodonta levata* (Hall).**

Nucula levata Hall, Pal. New York, 1, 1847, p. 150, pl. 34, figs. 1a-i.—McCoy, Brit. Pal. Rocks and Foss., 1854, p. 285, pl. 1 K, figs. 4, 5.

Leda levata Emmons, Amer. Geology, 1, pt. 2, 1855, p. 173, pl. 14, fig. 10.

Tellinomya levata Hall, Canadian Nat. Geol., 1, 1856, p. 395 (gen. ref.).—Hitchcock, Geol. Vermont, 1, 1861, p. 295.—Hall, Desc. N. Sp. Fossils, Cincinnati, Ohio, 1871, pl. 3, fig. 27.—Emerson, Narrative Hall's 2d Arctic Exped., U. S. Navy Dep., 1879, p. 578, fig. 3.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1168, figs.

Tellinomya (*Ctenodonta*) *levata* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 521 (gen. ref.).

Ctenodonta levata—Continued.

- Ctenodonta levata* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 175, figs. 162a, b.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 165, pl. 11, figs. 18–22.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394.—Ruedemann, Bull. New York State Mus., 162, 1912, p. 100, pl. 6, fig. 1.
Trenton: Middleville, Trenton Falls, etc., New York; New Jersey; Pennsylvania; Kentucky, etc.

CTENODONTA LIMBATA Raymond. See *Vanuxemia limbata*.

CTENODONTA LOGANI Salter (part). See *Ctenodonta nasuta*.

Ctenodonta logani Salter.

- Tellinomya dubia* Hall (not Hall, 1847), 10th Ann. Rep. Reg. Univ. New York, 1857, p. 183, figs. 4, 5.
Ctenodonta logani Salter, Canadian Org. Rem., dec. 1, 1859, p. 36, pl. 8, figs. 3, 3a.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 591, pl. 42, figs. 26–28.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394, fig. 502a–b.
Black River: Pauquettes Rapids, Ottawa River, etc., Canada (Leray); Beloit, Wisconsin (Platteville).

Ctenodonta longa (Ulrich).

- Tellinomya longa* Ulrich, Amer. Geol., 10, 1892, p. 103, pl. 7, figs. 17, 18.
Ctenodonta longa Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 590, pl. 38, figs. 30, 31.
Black River (Decorah): Goodhue County, Minnesota.
Holotype.—Cat. No. 46135, U.S.N.M.

Ctenodonta lorrainensis Foerste,

- Ctenodonta lorrainensis* Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 305, pl. 3, figs. 8a–b.
Cincinnati (Pulaski): Near Worthville and Lorraine, New York; Chambly, Quebec.

Ctenodonta machæriiformis (Hall).

- Nucula machæriiformis* Hall, Geol. Rep. 4th Dist. New York, 1843, p. 76, fig. 2; tab. ill. 8, fig. 2.—Owen, Amer. Jour. Sci. and Arts, 48, 1845, p. 306, fig. 2.
Tellinomya machæriiformis Hall, Pal. New York, 2, 1852, p. 85, pl. 27, figs. 8a–d, 9.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1169, fig.
Ctenodonta machæriiformis Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394.
Cypricardia? angusta Hall, Nat. Hist. New York, Geol., 4, 1843, p. 76, fig. 6; tab. ill. 8, fig. 6.—Owen, Amer. Jour. Sci. and Arts, 48, 1845, p. 306, fig. 6.
Cypricardites angustus Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 178, fig.
Lower Clinton: Wolcott, New York.

Ctenodonta mactrififormis (Hall).

- Nucula mactrififormis* Hall, Nat. Hist. New York, Geol., 4, 1843, p. 76, fig. 4; tab. ill. 8, fig. 4.
Nucula mactrififormis Owen, Amer. Jour. Sci. and Arts, 48, 1845, p. 306, fig. 4.
Tellinomya mactrififormis Miller, N. A. Geol. Pal., 1889, p. 515 (gen. ref.)—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1169, fig.
Lower Clinton: New York.

Ctenodonta madisonensis Ulrich.

- Ctenodonta madisonensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 597, pl. 42, figs. 65–66.
Richmond (Arnheim): Madison, Indiana.
Holotype.—Cat. No. 46136, U.S.N.M.

Ctenodonta medialis Ulrich.

Ctenodonta medialis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 593, pl. 42, figs. 50-52.

Black River (Decorah): Minneapolis, and near Cannon Falls Minnesota; Lincoln County, Missouri.

Cotypes.—Cat. Nos. 46137, 46138, U.S.N.M.

Ctenodonta minima (Foerste).

Nucula minima Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 93, pl. 14, figs. 8a-c.

Tellinomya (*Nucula*?) *minima* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 563, pl. 26, figs. 8a-c; pl. 37, figs. 13a-c.

Upper Medina (Brassfield): Huffman's Quarry, near Dayton, Ohio.

Ctenodonta nasuta (Hall).

Tellinomya nasuta Hall, Pal. New York, 1, 1847, p. 152, pl. 34, figs. 3a-c.—Pictet, *Traite de Pal.*, 2d ed., 3, 1855, p. 534, pl. 79, fig. 19.—Hall, *Canadian Nat. Geol.*, 1, 1856, p. 392, figs. 1-3; 10th Rep. New York State Cab. Nat. Hist., 1857, p. 183 (ext., p. 143), fig. 2 (part).—Hitchcock, *Geol. Vermont*, 1, 1861, p. 296, fig. 204.—Whitfield, *Geol. Wisconsin*, 4, 1882, p. 207, pl. 5, fig. 12.—Chamberlin, *Geol. Wisconsin*, 1, 1883, p. 156, fig.—Miller, *N. A. Geol. Pal.*, 1889, p. 515, fig. 932.—Leeley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1890, p. 1169, fig.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 446, pl. 10, fig. 1.

Tellinomya (*Ctenodonta*) *nasuta* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 521 (gen. ref.).

Lyonsia nasuta Emmons, *Amer. Geology*, 1, pt. 2, 1855, p. 170, fig. 40.

Ctenodonta logani Salter, (not Salter, 1859), Rep. Brit. Assoc. Adv. Sci., 1851 p. 63.

Ctenodonta nasuta Salter, *Canadian Org. Rem.*, dec. 1, 1859, p. 35, pl. 8, figs. 1, 2.—Billings, *Canadian Nat. Geol.*, 4, 1859, p. 446; *Geol. Canada*, *Geol. Surv. Canada*, 1863, p. 176, figs. 166a, b.—Roemer, *Leth. geog.*, 1, *Leth. Pal.*, Atlas, 1876, pl. 4, fig. 15a.—Ehler, Bull. Soc. Geol. France, 3d ser., 16, 1888, p. 663, pl. 16, figs. 3-3b.—Ulrich, *Geol. Minnesota*, 3, pt. 2, 1894, p. 584, pl. 42, fig. 30.—Weller, *Geol. Surv. New Jersey*, Pal., 3, 1903, p. 163, pl. 11, fig. 1.—Whiteaves, *Ottawa Naturalist*, 22, 1908, p. 106.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1909, p. 393, fig. 502o.

Trenton: Trenton Falls, etc., New York.

Black River: Pauquettes Rapids, Ottawa River, etc., Canada; New Jersey; Indiana; Wisconsin; Missouri; Illinois; Minnesota; etc.

Plesiotype.—Cat. No. 46137, U.S.N.M.

Ctenodonta nasuta robusta Ulrich.

Tellinomya nasuta Hall (part), 10th Rep., New York State Cab. Nat. Hist., 1857, p. 183, figs. 1, 3.

Ctenodonta nasuta var. *robusta* Ulrich, *Geol. Minnesota*, 3, pt. 2, 1894, p. 585, pl. 42, fig. 30.

Black River: Beloit, Wisconsin (Platteville); Pauquettes Rapids, Ottawa River, Canada (Leray).

Holotype.—Cat. No. 46140, U.S.N.M.

Ctenodonta nitida (Ulrich).

Tellinomya nitida Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1892, p. 215, fig. 1.

Ctenodonta nitida—Continued.

Ctenodonta nitida Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 592, pl. 42, figs. 44-49.

Black River (Decorah): Minneapolis, etc., Minnesota.

Cotypes.—Cat. No. 46141, U.S.N.M.

Ctenodonta novicia (Sardeson).

Tellinomya novicia Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 74, pl. 3, fig. 3.

St. Peter: South St. Peter and Dayton's Bluff, Minnesota.

Ctenodonta? nucleiformis (Hall).

Tellinomya nucleiformis Hall, Pal. New York, 3, 1859, p. 263, pl. 49, fig. 1.

Cayuga (Manlius): Winfield, Herkimer County, New York.

Ctenodonta nuculiformis (Hall).

Modiolopsis? nuculiformis Hall, Pal. New York, 1, 1847, p. 298, pl. 82, figs. 5a, b.

Tellinomya nuculiformis Miller, N. A. Geol. Pal., 1889, p. 515 (gen. ref.).

Lyonsia nuculiformis Emmons, Amer. Geology, 1, pt. 2, 1855, p. 172.

Ctenodonta nuculiformis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 581 (gen. ref.).

Utica: Turin and Waterford, New York.

Ctenodonta obliqua (Hall).

Nucula obliqua Hall, Amer. Jour. Sci. and Arts, 43, 1845, p. 292.

Tellinomya? obliqua Meek, Pal. Ohio, 1, 1873, p. 139, pl. 11, figs. 11a-c.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 229.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1169, figs.

Ctenodonta obliqua Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 604, pl. 42, figs.

83-87.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394, fig. 502i-j.

Palaeoconcha obliqua Miller, N. A. Geol. Pal., 1889, p. 498 (gen. ref.).

Palaeoconcha faberi Miller, N. A. Geol. Pal., 1889, p. 498, fig. 878.—Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 150.

Trenton-Richmond: Cincinnati, Ohio, and vicinity; Kentucky; Tennessee; Illinois; Iowa; etc.

Plesiotypes.—Cat. No. 46142, 46143, U.S.N.M.

Ctenodonta ohloensis Bassler (new name).

Tellinomya (*Nucula*?) *socialis* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 563, pl. 37, figs. 12a-c.

Upper Medina (Brassfield): Near Dayton, Ohio.

Ctenodonta ovata (Hall).

Tellinomya ovata Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 28.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 52, pl. 6, fig. 9.

Ctenodonta ovata Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 581 (gen. ref.).

Black River (Platteville): Beloit, Wisconsin.

Ctenodonta oviformis Ulrich.

Ctenodonta oviformis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 586, pl. 42, fig. 29.

Trenton (Prosser): Near Cannon Falls, Minnesota.

Black River (Auburn): Lincoln County, Missouri.

Holotype.—Cat. No. 46144, U.S.N.M.

Ctenodonta parvidens Raymond.

Ctenodonta parvidens Raymond, Amer. Jour. Sci., 20, 1905, p. 372.—Whiteaves,

Ottawa Nat., 22, 1908, p. 113, pl. 3, fig. 16.

Chazy (Aylmer): Hog Back, Ottawa, Ontario.

Ctenodonta pectunculoides (Hall).

Tellinomya pectunculoides Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 228, pl. 7, fig. 26. (Separate, 1871, p. 4, pl. 3, fig. 26.)—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 229.—Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 81, pl. 1, fig. 24.—Lesley, Geol. Surv. Pennsylvania' Rep. P 4, 1890, p. 1169, fig.

Eden-Maysville: Cincinnati, Ohio, and vicinity.

Ctenodonta peracuta Raymond.

Ctenodonta peracuta Raymond, Amer. Jour. Sci., 20, 1905, p. 371.

Chazy (Crown Point, Valcour): Sloop Bay, Valcour Island, New York.

Ctenodonta perminuta Ulrich.

Ctenodonta perminuta Ulrich, Geol. Surv. Ohio, 7, 1893, p. 680, pl. 46, figs. 11-14.

Eden-Maysville: Cincinnati, Ohio, and vicinity.

Cotypes.—Cat. No. 46145, U.S.N.M.

Ctenodonta planodorsata (Ulrich).

Tellinomya planodorsata Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1892, p. 217, fig. 3.

Ctenodonta planodorsata Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 589, pl. 37, figs. 25-28; pl. 42, figs. 38-40.

Black River (Decorah): Cannon Falls, etc., Minnesota.

Holotype and *paratypes*.—Cat. No. 46146, U.S.N.M.

Ctenodonta prosseri Ruedemann.

Ctenodonta prosseri Ruedemann, Bull. New York State Mus., 162, 1912, pl. 6, figs. 4, 5.

Trenton (Snake Hill): Snake Hill, etc., Saratoga and Albany Counties, New York.

Ctenodonta pulchella (Hall).

Lyrodesma pulchella Hall, Pal. New York, 1, 1847, p. 302, pl. 82, figs. 12a-d.

Tellinomya pulchella Hall, Canadian Nat. Geol., 1, 1856, p. 395 (gen. ref.).

Leda pulchella Emmons, Amer. Geology, 1, pt. 2, 1855, p. 173.

Ctenodonta pulchella Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 581 (gen. ref.).

Trenton: Near Watertown, etc., New York.

Ctenodonta radiata Ruedemann.

Ctenodonta radiata Ruedemann, Bull. New York State Mus., 162, 1912, p. 102, pl. 6, fig. 6.

Trenton (Snake Hill): Snake Hill, Saratoga County, New York.

Ctenodonta recta Ruedemann.

Ctenodonta recta Ruedemann, Bull. New York State Mus., 162, 1912, p. 102, pl. 6, figs. 7, 8.

Trenton (Snake Hill): Snake Hill, Saratoga County, New York.

Ctenodonta recurva (Ulrich).

Tellinomya recurva Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1892, p. 221, fig. 7.

Ctenodonta recurva Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 603, pl. 42, figs. 98-101.

Richmond: Spring Valley, etc.; Minnesota; Oxford, Waynesville, etc., Ohio; Richmond, Indiana.

Cotypes.—Cat. No. 46147, U.S.N.M.

Ctenodonta retrorsa Ulrich.

Ctenodonta retrorsa Ulrich, Geol. Surv. Ohio, 1893, p. 679, pl. 50, figs. 14, 15.
Trenton (Hermitage): Near Burgin, Kentucky.
Holotype.—Cat. No. 46149, U.S.N.M.

Ctenodonta sanguinolaroidea (Hall).

Tellinomya sanguinolaroidea Hall, Pal. New York, 1, 1847, p. 152, pl. 34, figs. 4a, b.
Tellinomya (*Ctenodonta*) *sanguinolaroidea* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 521 (gen. ref.).
Lyonsia sanguinolaroidea D'Orbigny, Prodr. Pal., 1, 1850, p. 10 (gen. ref.).—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 170, pl. 14, fig. 2.
Trenton: Canajoharie and Middleville, New York.

Ctenodonta scofieldi Ulrich.

Ctenodonta scofieldi Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 593, pl. 42, figs. 53–58.
Tellinomya scofieldi Miller, N. A. Geol. Pal., 2d App., 1897, p. 785 (gen. ref.).
Black River (Decorah): Cannon Falls and Minneapolis, Minnesota.
Cotypes.—Cat. Nos. 46150, 46151, U.S.N.M.

Ctenodonta similis (Ulrich).

Tellinomya similis Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, March, 1892, p. 220, fig. 6.
Ctenodonta similis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 604, pl. 42, figs. 102–106.
Tellinomya (*Nucula*) *lepida* Sarseson, Bull. Minnesota Acad. Nat. Sci., 3, April, 1892, p. 339, pl. 6, figs. 18–20.
Richmond: Spring Valley, etc., Minnesota; Blanchester, Ohio.
Cotypes and *pleiotypes*.—Cat. Nos. 46147, 46152, U.S.N.M.

Ctenodonta simulatrix Ulrich.

Ctenodonta simulatrix Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 600, pl. 42, figs. 74, 75.
Richmond (Maquoketa): Near Spring Valley, Minnesota.
Holotype.—Cat. No. 46153, U.S.N.M.

Ctenodonta sinuosa (Simpson).

Nucula sinuosa Simpson, Trans. Amer. Phil. Soc., n. s., 16, 1890, p. 451, fig. 19.
Clinton: Seven miles northwest of Lewistown, Pennsylvania.

Ctenodonta socialis Ulrich.

Ctenodonta socialis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 594, pl. 42, figs. 59, 60.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 394, fig. 502e–f.
Tellinomya socialis Miller, N. A. Geol. Pal., 2d App., 1897, p. 785 (gen. ref.).
Black River (Decorah): Minneapolis, Chatfield, etc., Minnesota.
Trenton (Hermitage): Central Kentucky.
Cotypes.—Cat. Nos. 46154, 46155, U.S.N.M.

Ctenodonta subcuneata Ruedemann.

Ctenodonta subcuneata Ruedemann, Bull. New York State Mus., 162, 1912, p. 103, pl. 6, figs. 9, 10.
Trenton (Snake Hill), Snake Hill, Saratoga County, New York.

Ctenodonta subelliptica Savage.

Ctenodonta subelliptica Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 93, pl. 5, fig. 25.

Upper Medinan (Edgewood): Near Edgewood, Missouri.

Ctenodonta subnasuta Ulrich.

Ctenodonta subnasuta Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 585, pl. 42, figs. 34-36.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 185.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 160, pl. 13, figs. 4-6.

Trenton: Near Cannon Falls, Minnesota (Prosser); Lake Winnipeg and Baffin Land, Canada.

Holotype and *pleiotype*.—Cat. Nos. 46156, 28163, U.S.N.M.

Ctenodonta subovata Whiteaves.

Ctenodonta subovata Whiteaves, Ann. Rep. Geol. Surv. Canada, n. s., 14, App. F, 1904, p. 47; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 256, pl. 27, figs. 9, 9a.

Niagaran: Ekwan River, Canada.

Ctenodonta subrecta (Clarke).

Tellinomya subrecta Clarke, Archivos. Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 17, pl. 2, fig. 16.

Silurian: Rio Trombetas, Brazil.

Ctenodonta subrotunda (Ulrich).

Tellinomya subrotunda Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1892, p. 219, fig. 5.

Ctenodonta subrotunda Hayes and Ulrich, U. S. Geol. Surv. Folio 95, illus. sheet, 1903, figs. 40, 41.

Trenton: Mercer County, Kentucky (Curdsville); near Cannon Falls, Minnesota (Prosser); Tennessee (Bigby).

Holotype.—Cat. No. 46157, U.S.N.M.

Ctenodonta subtrigona (Simpson).

Nucula subtrigona Simpson in Lealey, Geol. Surv. Pennsylvania, Rep. P 4, p. 472, figs.; Trans. Amer. Phil. Soc., n. s., 16, p. 452, fig. 20.

Clinton: Orbisonia, Huntington County, Pennsylvania.

CTENOPLEURON Matthew.

Genotype: *C. nerepisense* Matthew.

Ctenopleuron Matthew, Trans. Royal Soc. Canada, 3d ser., 1, sec. 4, 1907, p. 7.

Ctenopleuron nerepisense Matthew.

Ctenopleuron nerepisense Matthew, Trans. Royal Soc. Canada, 3d ser., 1, sec. 4, 1907, p. 7, 1 pl.

Clinton??: Cunningham Brook, near Nerepis Station, Kings County, New Brunswick.

CTENOPTERUS Clarke and Ruedemann. See *Stylonurus* subgenus *Ctenopteris*.

CTENOPYGE Linnarsson. Genotype: *Olenus* (*Sphaerophthalmus*) *pecten* Salter.

Ctenopyge Linnarsson, Geol. Fören. Stockholm Forh., 5, 1880, p. 145; Sver. Geol. Unders., ser. C, No. 43, 1880, p. 15.—Brügger, Die sil. Etagen 2-3, Kristiania, 1882, p. 113.—Zittel, Handb. d. Pal., 2, 1885, p. 596.—Matthew Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 55.—Koken, Die Leitfossilien, Leipzig, 1896, p. 20, fig. 11; figs. 7, 14.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., No. 8, 1901, pp. 26, 29.—Lake, Paleontographical Soc., 1913, p. 78.

Ctenopyge acadica Matthew.

Ctenopyge acadica Matthew, Trans. Royal Soc. Canada, 11, sec. 4, 1894, p. 109, pl. 17, figs. 13a-e.

Canadian (Bretonian—Div. C3b): St. John, New Brunswick.

CTENOPTYGE FLAGELLIFER Angelin. See *Sphaerophthalmus flagellifer*.

Ctenopyge? lobata (Brögger).

Leptoplastus (*Ctenopyge*?) *lobata* Brögger, Die sil. Etagen 2-3, Kristiania, 1882, p. 121, pl. 12, fig. 11.

Ctenopyge lobata? Matthew, Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 223.

Lower Ordovician: Europe; McNeil Brook, Cape Breton, Nova Scotia (Bretonian—Div. C3b).

Ctenopyge pecten (Salter).

Olenus (*Sphaerophthalmus*) *pecten* Salter, Mem. Geol. Surv., dec. 11, 1864, p. 9, pl. 8, figs. 11, 13; Quart. Jour. Geol. Soc. London, 21, 1865, p. 481, figs. 4, 5.

Ctenopyge pecten Linnarsson, Geol. For. Stockholm Forh., 5, 1880, p. 146 (cites bibliography); Afh. Sveriges Geol. Unders, ser. C, No. 43, 1880, p. 16, pl. 2, figs. 3-9.—Lake, Paleontographical Soc., 1913, p. 85 (see for complete bibliography).

Lower Ordovician: Great Britain; East Bay, east of Bras d'Or Lake, Cape Breton, Nova Scotia; St. John, New Brunswick (Bretonian—Div. C3a, b).

Ctenopyge spectabilis (Brögger).

Leptoplastus (*Ctenopyge*) *spectabilis* Brögger, Die sil. Etagen 2-3, Kristiania, 1882, p. 120, pl. 2, fig. 18a, b; pl. 12, fig. 12a-c.

Ctenopyge spectabilis var. *Matthew*, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 57, pl. 13, figs. 13a, b.

Ctenopyge spectabilis Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, p. 51.

Lower Ordovician: Europe; St. John, New Brunswick (Bretonian—Div. C3b).

CUNEAMYA Hall and Whitfield. Genotype: *C. miamiensis* Hall and Whitfield.

Cuneamya Hall and Whitfield, Pal. Ohio, 2, 1875, p. 90.—Zittel, Handb. Pal., 2, 1881, p. 128.—Miller, N. A. Geol. Pal., 1889, p. 473.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 620.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 378.

Cuneamya acutifrons Ulrich.

Cuneamya acutifrons Ulrich in Ruedemann, Bull. New York State Mus., 162, 1912, p. 106, pl. 6, figs. 15, 16, text fig. 30.

Trenton: Covington, Kentucky; Snake Hill, Saratoga County, New York (Snake Hill).

Holotype.—Cat. No. 47314, U.S.N.M.

Cuneamya alveata Whitfield and Hovey.

Orthonota curta? Hall (not Hall, 1843), Pal. New York, 2, 1852, pp. 86, 285, pl. 27, figs. 11a, b; pl. 59, fig. 8.

Cuneamya alveata Whitfield and Hovey, Bull. Amer. Mus. Nat. Hist., 11, 1899, pt. 2, p. 188.

Lower Clinton: Walcott, New York.

Cuneamya? caswelli (Foerste).

Grammysia Caswelli Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 92, pl. 14, figs. 12a, b.

Cuneamya caswelli—Continued.

Cypriocardites Caswelli Foerste, Geol. Surv. Ohio Pal., 7, 1893, p. 561, pl. 26, figs. 12a, b; pl. 37, figs. 1a-c.

Upper Medinan (Brassfield): Soldier's Home, near Dayton, Ohio.

Cuneamya coriformis Miller.

Cuneamya coriformis Miller, N. A. Geol. Pal., 1889, p. 474, figs. 805, 806.

Maysville (McMillan): Cincinnati, Ohio.

Cuneamya curta Whitfield.

Cuneamya curta Whitfield, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 138, pl. 6, figs. 6, 6a.—Ulrich, Geol. Minnesota, 3, 1894, pt. 2, p. 477, fig. 35.

Richmond (Waynesville): Clarksville, etc., Ohio.

Plesiotype.—Cat. No. 46158, U.S.N.M.

Cuneamya elliptica Miller.

Cuneamya elliptica Miller, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 317, pl. 8, figs. 3, 3a.

Maysville (McMillan): Cincinnati, Ohio.

Cuneamya miamiensis Hall and Whitfield.

Cuneamya Miamiensis Hall and Whitfield, Geol. Surv. Ohio Pal., 2, 1875, p. 91, pl. 2, figs. 9, 10.—Miller, N. A. Geol. Pal., 1889, p. 474, figs. 807, 808.—

Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 378, fig. 481.

Richmond (Waynesville): Waynesville, etc., Ohio.

Cuneamya neglecta (Meek).

Sedgwickia (Grammysia?) neglecta Meek, Proc. Acad. Nat. Sci. Philadelphia, 1872, p. 325; Geol. Surv. Ohio, Pal., 1, 1873, p. 142, pl. 12, fig. 8.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 220.—Lesley, Geol. Surv. Pennsylvania Rep. P 4, 1890, p. 947, figs.

Grammysia neglecta Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 91, pl. 2, fig. 11.

Cuneamya neglecta Miller, N. A. Geol. Pal., 1889, p. 474 (gen. ref.).

Richmond (Waynesville): Clinton County, Ohio.

Cuneamya oblonga Ulrich.

Cuneamya oblonga Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 623, pl. 36, figs. 40-41.

Trenton (Galena): Dixon, Illinois.

Holotype.—Cat. No. 46159, U.S.N.M.

Cuneamya parva Miller.

Cuneamya parva Miller, Jour. Cincinnati Soc. Nat. Hist., 3, 1881, p. 316, pl. 8, figs. 5, 5a.

Eden (Southgate): Cincinnati, Ohio.

Cuneamya scapha Hall and Whitfield.

Cuneamya scapha Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 92, pl. 2, fig. 12.

Richmond (Waynesville): Near Waynesville, Ohio.

Cuneamya scapha brevior Foerste.

Cuneamya scapha brevior Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 307, pl. 2, fig. 12.

Cincinnati (Pulaski): Riviere des Hurons, near St. Jean Baptiste, etc., Quebec.

CUNEAMYA SULCODORSATA Ulrich. See *Saffordia sulcodorsata*.

Cuneamya truncatula Ulrich.

Cuneamya truncatula Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 622, p. 36, fig. 39.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 162, pl. 11, fig. 6.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 378, fig. 482a.
Trenton: Near Wykoff and Pleasant Grove, Minnesota (Prosser); New Jersey.
Holotype.—Cat. No. 46160, U.S.N.M.

Cuneamya vetusta (Hall).

Cardiomorpha vetusta Hall, Pal. New York, 1, 1847, p. 154, pl. 34, fig. 8.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 116, text. fig.
Cypicardites vetusta Miller, N. A. Geol. Pal., 1889, p. 476 (gen. ref.).
Trenton: Middleville, New York.

CUPELLACRINUS CORRUGATUS Shumard. See *Marsipocrinus corrugatus*.

CUPELLACRINUS MAGNIFICUS Shumard. See *Marsipocrinus magnificus*.

CUPELLACRINUS PENTAGONALIS Shumard. See *Marsipocrinus pentagonalis*.

CUPELLACRINUS STELLATUS Wachsmuth and Springer. See *Marsipocrinus pentagonalis*.

CUPELLÆCRINITES Troost. See *Marsipocrinus Bather*.

CUPELLÆCRINITES BUCHII Troost. See *Marsipocrinus tennesseensis*.

CUPELLÆCRINITES CONICUS Troost. See *Coccocrinus conicus*.

CUPELLÆCRINITES INFLATUS Troost. See *Marsipocrinus striatus*.

CUPELLÆCRINITES LEVIS Troost. See *Marsipocrinus tennesseensis*.

CUPELLÆCRINUS Meek and Worthen. See *Marsipocrinus Bather*.

CUPELLÆCRINUS LEVIS Shumard. See *Marsipocrinus tennesseensis*.

CUPELLÆCRINUS Meek and Worthen. See *Marsipocrinus Bather*.

CUPULOCRINUS D'Orbigny. Genotype: *Scyphocrinus heterocostalis* Hall.
Scyphocrinus Hall (not Zenker, 1839), Pal. New York, 1, 1847, p. 85.

Cupulocrinus D'Orbigny, Prod. Pal. Strat., 1, 1849, p. 23; Cours. Elementaire de Pal. et Geol., 2, 1851, p. 144.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 224.—Zittel, Handb. Pal., 1, 1879, p. 375.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 395 (Rev. Pal., pt. 2, p. 221).—Miller, N. A. Geol. Pal., 1889, p. 235.—Bather, Treatise on Zool. (Lanckester), pt. 3, 1900, p. 202.—Springer, Mem. Geol. Surv. Canada, 15 P, 1911, p. 28; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 215.

Cupulocrinus conjugans (Billings).

Dendrocrinus conjugans Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 268; Geol. Surv. Canada, dec. 4, 1859, p. 41, pl. 4, figs. 1a, b, 2a, b.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 504.
Cupulocrinus conjugans Springer, Mem. Geol. Surv. Canada, 15 P, 1911, p. 37.
Dendrocrinus cylindricus Billings, Geol. Surv. Canada, dec. 4, 1859, p. 44, pl. 3, figs. 8a, 8b.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 505.
Trenton (Curdsville): Ottawa and Kirkfield, Ontario; Montreal, Quebec.

Cupulocrinus heterocostalis (Hall).

Scyphocrinus heterocostalis Hall, Pal. New York, 1, 1847, p. 85, pl. 28, figs. 3d, e; 12th Rep. Regents Univ. State New York, 1860, p. 75.

Cupulocrinus heterocostalis—Continued.

Cupulocrinus heterocostalis D'Orbigny, *Prod. Pal. Strat.*, 1, 1849, p. 23 (gen. ref.).—Emmons, *Amer. Geology*, 1, pt. 2, 1855, p. 225.—Springer, *Mem. Geol. Surv. Canada*, 15 P, 1911, p. 30, fig. 3.

Trenton: Middleville, New York.

Cupulocrinus humilis (Billings).

Dendrocrinus humilis Billings, *Geol. Surv. Canada, Rep. Progr. for 1853-1856*, 1857, p. 270.—*Geol. Surv. Canada*, dec. 4, 1859, p. 39, pl. 3, fig. 4.

Cupulocrinus humilis Springer, *Mem. Geol. Surv. Canada*, 15 P, 1911, p. 28, pl. 1, figs. 8, 9; pl. 3, figs. 1-3, p. 29, fig. 2.

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

Cupulocrinus jewettii (Billings).

Dendrocrinus Jewettii Billings, *Geol. Surv. Canada*, dec. 4, 1859, p. 43, fig. 15; *Trans. Ottawa Field Nat. Club.*, 1, 1883, p. 51, pl. figs.—Miller, *N. A. Geol. Pal.*, 1889, p. 238, fig. 283.

Cupulocrinus jewettii Springer, *Mem. Geol. Surv. Canada*, 15 P, 1911, p. 28, pl. 3, figs. 5-7.

Trenton (Curdsville): Bay of Quinte, and Kirkfield, Ontario.

Cupulocrinus jewettii kentuckiensis Springer.

Cupulocrinus jewettii var. *kentuckiensis* Springer, *Mem. Geol. Surv. Canada*, 15 P, 1911, p. 28, pl. 3, figs. 8, 9.

Trenton (Curdsville): Woodford County, Kentucky.

Cupulocrinus latibrachiatus (Billings).

Dendrocrinus latibrachiatus Billings, *Geol. Surv. Canada, Rep. Progr. for 1853-1856*, 1857, p. 270; *Geol. Surv. Canada*, dec. 4, 1859, p. 39, pl. 3, figs. 5a-c; *Cat. Sil. Fossils Anticosti*, *Geol. Surv. Canada*, 1866, p. 9 (loc. ref.).—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 505.

Cupulocrinus latibrachiatus Springer, *Mem. Geol. Surv. Canada*, 15 P, 1911, p. 29 (gen. ref.).

Richmond (Charleton): Charleton Point, Anticosti.

Cupulocrinus polydactylus (Shumard).

Homocrinus polydactylus Shumard, *Trans. Acad. Sci. St. Louis*, 1, 1857, p. 78, pl. 1, figs. 6a, b.

Poteriocrinites (*Dendrocrinus*) *polydactylus* Meek, *Proc. Acad. Nat. Sci. Philadelphia*, 1871, p. 314.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1889, p. 740, fig.

Poteriocrinus (*Dendrocrinus*) *polydactylus* Meek, *Geol. Surv. Ohio*, Pal., 1, 1873, p. 22, pl. 3 bis, fig. 9.

Dendrocrinus polydactylus Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 719, pl. 3, fig. 4.—Wood, *Bull. U. S. Nat. Mus.*, 64, 1909, p. 83.

Cupulocrinus polydactylus Springer, *Mem. Geol. Surv. Canada*, 15 P, 1911, p. 29 (gen. ref.).

Cyathocrinites conglobatus Troost, *Proc. Amer. Ass. Adv. Sci.*, 2, 1850, p. 61 (nom. nud).

Richmond (Waynesville-Whitewater): Richmond, etc., Indiana; Oxford, etc., Ohio.

Plesiotype.—Cat. No. 39950, U.S.N.M. (Troost's type of *C. conglobatus*).

CYATHASPIS Lankester.

Genotype: *C. bankai* Huxley and Salter.

Cyathaspis Lankester, Rep. 24th Meeting British Asso. Adv. Sci., 1865, p. 100.

(See Hay, *Bull. U. S. Geol. Surv.*, 179, for additional refs.)

Diplaspis Matthew, *Bull. Nat. Hist. Soc. New Brunswick*, 6, 1887, p. 69.

Cyathaspis acadica (Matthew).

Pteraspis acadica Matthew, Canadian Rec. Sci., 2, 1886, pp. 251, 323.

Diplaspis acadica Matthew, Trans. Royal Soc. Canada, 6, 1888, p. 49, pl. 4; Amer. Geol., 8, 1891, p. 61.

Cyathaspis acadica Hay, Bull. U. S. Geol. Surv., 179, 1902.

Silurian?: Nerepis Hills, near St. John, New Brunswick.

CYATHAXONIA COLUMELLATA Hall. See *Lindströmia?* *columellata*.

CYATHAXONIA GAINESI Davis. See *Lindströmia gainesi*.

CYATHAXONIA HERZERI Hall. See *Lindströmia herzeri*.

CYATHAXONIA WISCONSINENSIS Whitfield. See *Lindströmia wisconsinensis*.

CYATHOCRINITES Meek and Worthen. See *Cyathocrinus* Miller.

CYATHOCRINITES CONGLOBATUS Troost. See *Cupulocrinus polydactylus*.

CYATHOCRINITES PYRIFORMIS Hall. See *Ichthyocrinus lævis*.

CYATHOCRINITES SCULPTUS Troost. See *Chirocrinus angulatus*.

CYATHOCRINITES TENNESSEÆ Troost. See *Cyathocrinus brittai*.

CYATHOCRINUS Miller.

Genotype: *C. planus* Miller.

Cyathocrinus Miller, Nat. Hist. Crin., 1821, p. 85.—Agassiz, Ann. Nat. Hist., 1, 1838, p. 447.—Koninck, Desc. Animaux Fossiles, Leige, p. 48.—McCoy, Syn. Char. Foss. Ireland, 1844, p. 178.—Austin and Austin, Mon. Recent and Fossil Crin., 1845, p. 58, fig. 65 (1846).—D'Orbigny, Prodr. de Pal., 1, 1849, pp. 46, 103.—King, Mon. Permian Foss. England, Pal. Soc., 1850, p. 50.—McCoy, British Pal. Rocks Foss., 1854, p. 76.—Koninck and Le Hon, Recher. Crin. Terr. Carb. Belgique (Mem. L'Acad. Royale Sci., 28), 1854, p. 79, fig.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 317.—Hall, Rep. Geol. Surv. Iowa, 1, pt. 2, 1858, pp. 622, 623, fig. 98.—White, Boston Jour. Nat. Hist., 7, 1863, pp. 493, 496.—Meek and Worthen, Geol. Surv. Illinois, 2, 1866, p. 175; Proc. Acad. Nat. Sci. Philadelphia, 1868, p. 324; Canadian Nat., n. s., 4, 1869, p. 436; Amer. Jour. Sci. and Arts, 2d ser., 48, 1869, p. 25.—Billings, *ibid.*, p. 73, footnote.—Thomson, Proc. Royal Soc. Edinburgh, 7, 1871, p. 416.—Salter, Cat. Camb. Sil. Foss., 1873, p. 123.—Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 94, footnote.—Wachsmuth, Amer. Jour. Sci., 3d ser., 14, 1877, p. 183; Ann. Mag. Nat. Hist., 5th ser., 1, 1878, p. 455.—Angelin, Icon. Crin., 1878, p. 22.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1878, p. 256; *ibid.*, 1879, p. 302 (Rev. Pal., pt. 1, p. 79); *ibid.*, 1883, p. 376, fig. 7; *ibid.*, 1887, p. 101; *ibid.*, 1890, p. 351.—Zittel, Handb. Pal., 1, 1879, p. 351.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th ser., 1, 1885, p. 822.—Miller, N. A. Geol. Pal., 1889, p. 235.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 324, pl. 14, fig. 20; pl. 15, fig. 3; *ibid.*, 9, 1892, p. 202; Kongl. Sv. Vet. Akad. Handl., 25, No. 2, 1893, pp. 126, 127, fig. 18.—Springer, Amer. Geol., 26, 1900, p. 133.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 156.—Bather, Amer. Geol., 26, 1900, p. 308; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 173, fig. 89.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 61, fig. 33.—Bather, Geol. Mag., dec. 4, 6, 1899, p. 35, fig. 15.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 506.

Anthocrinus Miller, Ann. Mag. Nat. Hist., 2d ser., 13, 1854, p. 255.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 312 (Genotype: *A. loveni* Miller).

CYATHOCRINUS—Continued.

Cyathocrinites Meek and Worthen, Proc. Acad. Nat. Sci., Philadelphia, 1868, p. 336; Geol. Surv. Illinois, 5, 1874, p. 400.—Meek, Amer. Jour. Sci. and Arts, 3d ser., 7, 1874, p. 369.

Cyathocrinus? æmulus Hall.

Cyathocrinus (*Poteriocrinus*) *æmulus* Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 266; Trans. Albany Inst., 10, 1883, p. 66 (prelim. notice, 1879, p. 10.).

Homocrinus? æmulus Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 158 (Rev. Pal., pt. 3, sec. 2, p. 234).

Niagaran (Waldron): Waldron, Indiana.

CYATHOCRINUS? ALTERNATUS Hall. See *Dendrocrinus alternatus*.

CYATHOCRINUS ANGULATUS Wachsmuth and Springer. See *Palæocrinus angulatus*.

Cyathocrinus benedicti Miller.

Cyathocrinus benedicti Miller, 17th Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1892, pl. 658, p. 9, fig. 7 (adv. sheets, 1891, p. 48).

Niagaran (Waldron): Hartsville, Indiana.

Cyathocrinus brittsi Miller and Gurley.

Cyathocrinites tennesseæ Troost, Proc. Amer. Assoc. Adv. Sci., 2, 1850 (nom. nud.).

Cyathocrinus tennesseæ Miller, N. A. Geol. Pal., 1889, p. 237.

Cyathocrinus brittsi Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 7, 1895, p. 70, pl. 4, figs. 35, 36.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 81, pl. 15, figs. 2, 3.

Niagaran (Brownsport): Decatur County, Tennessee.

(?Burlington: Sedalia, Missouri).

Observation.—Although recorded from the Burlington, the type of *C. brittsi* is probably from the Niagaran of West Tennessee.

Pleiotype.—Cat. No. 39948, U.S.N.M. (Troost's type of *C. tennesseæ*).

CYATHOCRINUS CORA Hall. See *Crotalocrinus cora*.

CYATHOCRINUS FASCIATUS Hall. See *Macrotylocrinus fasciatus*.

Cyathocrinus globosus (Troost).

Cyathocrinites globosus Troost, Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

Cyathocrinus globosus Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 82, pl. 5, figs. 17, 18.

Niagaran (Brownsport): Decatur County, Tennessee.

CYATHOCRINUS NUCLEUS Hall. See *Botryocrinus nucleus*.

Cyathocrinus? ovalis Rowley.

Cyathocrinus? ovalis Rowley, Amer. Geol., 34, 1904, p. 271, pl. 16, figs. 13-16.

Niagaran (Bainbridge): Near St. Marys, Ste. Genevieve County, Missouri.

CYATHOCRINUS PISIFORMIS Whitfield. See *Lecanocrinus pisiformis*.

CYATHOCRINUS POLYXO Hall. See *Botryocrinus polyxo*.

CYATHOCRINUS PULCHELLUS Wachsmuth and Springer. See *Palæocrinus pulchellus*.

CYATHOCRINUS PUSILLUS Hall. See *Lecanocrinus pusillus*.

CYATHOCRINUS PYRIFORMIS Lealey. See *Ichthyocrinus lævis*.

CYATHOCRINUS RHOMBIFERUS Wachsmuth and Springer. See *Palaecocrinus rhombiferus*.

CYATHOCRINUS SCULPTUS Wachsmuth and Springer. See *Chirocrinus angulatus*.

CYATHOCRINUS STRIATUS Wachsmuth and Springer. See *Palaecocrinus striatus*.

CYATHOCRINUS TENNESSEENSIS Miller. See *Cyathocrinus brittsi*.

Cyathocrinus turbinatus Weller.

Cyathocrinus turbinatus Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 65, pl. 14, fig. 13.

Niagara (Racine): Chicago, Illinois.

CYATHOCRINUS VANHORNEI Miller. See *Crotalocrinus vanhornei*.

CYATHOCRINUS WALDRONENSIS Miller and Dyer. See *Dimerocrinus waldronensis*.

CYATHOCRINUS WAUKOMA Hall. See *Lecanocrinus waukoma*.

CYATHODICTYA Hall and Clarke. See *Cyathophycus Walcott*.

CYATHOPHYCUS Walcott.

Genotype: *C. reticulatus* Walcott.

Cyathophycus, Walcott, Trans. Albany Inst., 10, 1883, p. 18 (adv. sheets, 1879).—Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1881, p. 15.—Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 466.—Dawson, Canadian Rec. Sci., 3, 1888, pp. 58, 67, footnote.—Miller, N. A. Geol. Pal., 1889, p. 158.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1, 1891, p. 63.—Rauff, *Palaontographica*, 40, 1894, p. 250.—James, Amer. Nat., 29, 1895, p. 542, fig. 6.

Cyathospongia Dawson, Canadian Rec. Sci., 3, 1888, p. 68, footnote.

Cyathospongia (*Cyathophycus*) Dawson and Hinde, Trans. Royal Soc. Canada, 7, sec. 4, 1890, p. 44.

Cyathodictya (new name for *Cyathophycus*), Hall and Clarke, Mem. New York State Mus., 2, 1898, p. 24.

Cyathophycus quebecense Dawson.

Cyathophycus Quebecensis Dawson, Canadian Rec. Sci., 3, 1888, p. 54.—Hinde, *ibid.*, p. 67.—Rauff, *Palaontographica*, 40, 1894, p. 251.—Dawson, Trans. Royal Soc. Canada, 2d ser., 2, sec. 4, 1896, p. 109, figs. 18, 19.

Cyathospongia Quebecensis Dawson and Hinde, Trans. Royal Soc. Canada, 7, sec. 4, 1890, p. 44, figs. 16, 17, pl. 3, fig. 7.

Canadian? (Levis?): Little Metis, Canada.

Cyathophycus reticulatum Walcott.

Cyathophycus reticulatus Walcott, Amer. Jour. Sci. Arts, 3d ser., 22, 1881, p. 396; Trans. Albany Inst., 10, 1883, p. 18, pl. 2, figs. 16, 16a-d.—Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 468, pl. 18, fig. 1.—Dawson, Canadian Rec. Sci., 3, 1888, p. 55.—Hinde, *ibid.*, p. 65.—Rauff, *Palaontographica*, 40, 1894, p. 252.

Cyathodictya reticulata Hall and Clarke, Mem. New York State Mus., 2, 1898, p. 24, pl. 1, figs. 1-13; 15th Rep. State Geol. New York for 1895, 1899, p. 764, pl. 1, figs. 1-13.

Utica: Holland Patent, Oneida County, New York.

Plesiotype.—Cat. No. 25349, U.S.N.M.

CYATHOPHYCUS SILURIANA James. See *Trichophycus siluriana*.

CYATHOPHYCUS SUBSPHERICUS Walcott. See *Teganium subsphericus*.

Cyathophycus? tubulare (Ruedemann).

Cyathodictya? tubularis Ruedemann, Bull. New York State Mus., 162, 1912, p. 75, figs. 8-12.

Trenton (Canajoharie): Canajoharie, New York.

Cyathophycus(?) walcotti (Rauff).

Dictyophytra(?) Walcott Rauff, Palaeontographica, 40, 1894, p. 249, pl. 4, fig. 12.—Hall and Clarke, Mem. State Mus. New York, 2, 1898, p. 50.

Utica: Holland Patent, Oneida County, New York.

Plesiotype.—Cat. No. 25348, U.S.N.M.

CYATHOPHYLLOIDES THOMI Walcott. See *Columnaria* (*Palaeophyllum*) *thomi*.

CYATHOPHYLLUM Goldfuss.

Genotype: *C. caespitosum* Goldfuss.

Cyathophyllum Goldfuss, Petrefacta, 1826, pp. 54, 244.—Koninck, Desc. Animaux Fossiles, Liege, 1842, p. 20.—Dana, Wilkes' U.S. Expl. Exped., 1838-42, 7, Zoophytes, 1846, p. 355.—Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5, pp. 167, 360).—McCoy, British Pal. Rocks Foss., 1854, p. 69.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 455.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 364.—Goldfuss, Petrefacta, 2d ed., pt. 1, 1862, p. 51.—Lindstrom, Geol. Mag., 3, 1866, p. 359.—Koninck, Animaux Foss. Terr. Carb. Belgique (Mem. l'Acad. Royale Sci. de Belgique, 39, p. 46), 1872.—Dybowski, Archiv. f. Naturf. Liv., Ehst. und Kurl., 5, 1873, p. 336.—Rominger, Geol. Surv. Mich., 3, pt. 2, 1876, p. 98.—Zittel, Handb. Pal., 1, 1879, p. 230.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 335.—Frech, Pal. Abh. Dames and Kayser, 3, Heft 3, 1886, p. 53.—Miller, N. A. Geol. Pal., 1889, p. 181.—Sherzer, Amer. Geology, 7, 1891, pp. 290-295; Bull. Geol. Soc. Amer., 3, 1892, p. 279.—Koken, Die Leitfossilien, Leipzig, 1896, p. 309.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 727.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 128; 7, 1901, p. 138; Bull. New York State Mus., 45, 1901, p. 138.—Zittel-Eastman Textb. Pal., 1, 1900, p. 76; *ibid.*, 2d ed., 1913, p. 84.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 133.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 2, 1902, p. 87.

Cyathophyllum agglomeratum Castelnau.

Not recognized.

Cyathophyllum agglomeratum Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 49, pl. 21, fig. 5.

Silurian: Manitoulin Islands, Lake Huron.

Cyathophyllum ammonis Castelnau.

Not recognized.

Cyathophyllum ammonis Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 48, pl. 21, fig. 1.

Silurian?: New York.

Cyathophyllum anticostiense Billings.

Cyathophyllum Anticostiense Billings, Pal. Foss., 1, 1865, Geol. Surv. Canada, p. 109 (adv. sheets, 1862); Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 34 (loc. ref.).—Lambe, Ottawa Nat., 12, 1899, p. 237; Cont. Canadian, Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 134, pl. 10, figs. 5-8.

Anticostian (Jupiter River and Chicotte): Southwest Point, etc., Anticosti.

Cyathophyllum arborescens Castelnau.

Not recognized.

Cyathophyllum arborescens Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 40, pl. 22, fig. 2.

Silurian: Northern shore of Lake Huron.

Cyathophyllum articulatum (Wahlenberg).

Madrepores articulatus Wahlenberg, Nov. Act. Sco. Upsala, 8, 1821, p. 87.

Cyathophyllum articulatum Milne-Edwards and Haime, Polyp. Foss. des. Terr. Pal., 1851, p. 377; British Foss. Corals, 1855, p. 282, pl. 67, figs. 1, la.—Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 584.—Lambe, Ottawa Nat., 12, 1899, p. 219; Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 135, pl. 10, figs. 9a, b.

Silurian: Gotland and England; "The Forks," Scaumenac River, Isle of Man, Lake Temiscaming, Quebec; Dobbins Bay, Arctic America (Niagaran).

Cyathophyllum atlas Castelnau.

Not recognized.

Cyathophyllum atlas Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 47, pl. 20, fig. 2.

Silurian: Drummond Island, Lake Huron.

Cyathophyllum bullulatum Hall.

Cyathophyllum bullulatum Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 416.

Niagaran?: Perry County, Tennessee.

Cyathophyllum caliculare Owen.

Not recognized.

Cyathophyllum caliculare Owen, Geol. Expl. Iowa, Wisconsin, and Illinois, 2d ed., 1844, p. 69, pl. 13, fig. 5.

Niagaran: Iowa and Wisconsin.

CYATHOPHYLLUM CALYCULUM Foerste. See *Enterolasma calyculus*.**CYATHOPHYLLUM CELATOR** VAR. **DAYTONENSIS** Foerste. See *Zaphrentis celator daytonensis*.**Cyathophyllum clarki** Swartz.

Cyathophyllum clarki Swartz, Maryland Geol. Surv., Low Dev., 1913, p. 201, pl. 19, figs. 5-9.

Helderbergian (Keyser): Devils Backbone, near Cumberland; Pinto, etc., Maryland.

Cyathophyllum conicum Castelnau.

Not recognized.

Cyathophyllum conicum Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 48, pl. 21, fig. 4.

Silurian?: Banks of the Ohio, Illinois.

CYATHOPHYLLUM CORITHEUM Owen. See *Ptychophyllum expansum*.**Cyathophyllum densiseptatum** Foerste.

Cyathophyllum densiseptatum Foerste, Bull. Geol. Surv. Kentucky, 7, 1906, p. 314, pl. 6, figs. 2a-f.

Clinton (Waco): Near Estill Springs, etc., Kentucky.

Cyathophyllum dilatatum Castelnau.

Not recognized.

Cyathophyllum dilatatum Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 48, pl. 21, fig. 3.

Silurian: Banks of Lake Huron.

Cyathophyllum distinctum Castelnau.

Not recognized.

Cyathophyllum distinctum Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 49, pl. 22, fig. 8.

Silurian: Manitoulin Islands, Lake Huron.

CYATHOPHYLLUM ERIPHYLE Billings. See *Omphyma eriphyle*.

Cyathophyllum euryone Billings.

Cyathophyllum Euryone Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 110 (adv. sheets, 1862); Cat. Sil. Fossils Anticosti, Geol. Surv. Canada, 1866, p. 34 (loc. ref.).—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 135, pl. 11, figs. 1, 1a, b.

Anticostian (Gun River-Chicotte): The Jumpers, etc., Anticosti.

Cyathophyllum facetum Foerste.

Cyathophyllum facetus Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 341, pl. 9, fig. 8.

Upper Medinan (Brassfield): Near Dayton, and Todds Fork, near Wilmington, Ohio.

Cyathophyllum flos Davis.

Cyathophyllum flos Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 78, figs. 11-14; pl. 83, fig. 10.

Niagaran (Louisville): Near Louisville, Kentucky.

Cyathophyllum goldfussi Castelnau.

Not recognized.

Cyathophyllum Goldfussi Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 47, pl. 21, fig. 2.

Silurian(?): Buffalo, New York.

Cyathophyllum goliath Castelnau.

Not recognized.

Cyathophyllum Goliath Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 47, pl. 20, fig. 1.

Silurian: Drummond Island, Lake Huron.

Cyathophyllum gracile Troost.

Not recognized.

Cyathophyllum gracile Troost, 5th Geol. Rep. Tennessee, 1840, p. 63.

Silurian(?): Perry County, Tennessee.

Cyathophyllum hydraulicum Simpson.

Cyathophyllum hydraulicum (Simpson MS.) Grabau, Bull. Geol. Soc. Amer., 2, 1900, p. 364, pl. 21, figs. 1a-d; Bull. New York State Mus., 45, 1901, p. 138, fig. 31; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 138, fig. 31.—Schuchert, Amer. Geol., 31, 1903, p. 163 (loc. occ.).—Grabau, Michigan Geol. Surv., Geol. Ser. 1, 1909, p. 97, pl. 31, figs. 1a-d.

Cayugan: Erie County (Akron), and Howes Cave, near Schoharie, New York (Manlius).

CYATHOPHYLLUM INEQUALE Swartz. See *Prismatophyllum inequale*.**Cyathophyllum interruptum** Billings.

Cyathophyllum interruptum Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 109 (adv. sheets 1862).—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 137, pl. 11, figs. 3, 3a, b.

Silurian: L'Anse a le Barbe, Baie des Chaleurs, Quebec.

Cyathophyllum intertrium Hall.

Cyathophyllum intertrium Hall, 12th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 273, pl. 15, figs. 9-11; 35th Rep. New York State Mus. Nat. Hist., 1884, p. 416 (ext. 1882, p. 12).—Lesley, Geol. Surv. Pennsylvania Rep. P. 4, 1889, p. 169, figs.

Niagaran (Louisville): Louisville, Kentucky.

***Cyathophyllum marylandicum* Swartz.**

Cyathophyllum marylandicum Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 204, pl. 21, figs. 1, 2.

Helderbergian (Keyser): Keyser, West Virginia.

***Cyathophyllum michelini* Castelnau.**

Not recognized.

Cyathophyllum Michelini Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 48, pl. 22, fig. 3.

Silurian: Drummond Island, Lake Huron.

CYATHOPHYLLUM MULTIPLICATUM Owen. See *Ptychophyllum expansum*.

CYATHOPHYLLUM NYMPHALE Billings. See *Chonophyllum nymphae*.

***Cyathophyllum pasithea* Billings.**

Cyathophyllum Pasithea Billings, New sp. L. Sil. Fossils, Geol. Surv. Canada, 1865, p. 112 (adv. sheets, 1862).—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 148, pl. 12, figs. 5, a, b.

Silurian: L'Anse a la Vieille, Bay of Chaleurs, Quebec.

***Cyathophyllum pauciradiatum* D'Orbigny.**

Cyathophyllum pauciradiatum D'Orbigny, Prod. de Pal., 1847, p. 47.—Boule and Thevenin, Ann. de Pal., 1, 1906, p. 7, pl. 3, figs. 6, 7.

Silurian (?): Falls of the Ohio.

Observation.—Although considered a Silurian species and synonymous with *Amplexus shumardi*, the figures given by Boule and Thevenin refer to a Devonian species of *Blothrophyllum*.

CYATHOPHYLLUM PELAGICUM Billings. See *Diplophyllum caespitosum*.

***Cyathophyllum pennanti* Billings.**

Cyathophyllum Pennanti Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 107 (adv. sheets, 1862).—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 138, pl. 11, figs. 4, a, b.

Silurian: L'Anse a Gascon, Bay of Chaleurs, Quebec.

***Cyathophyllum pickthorni* (Salter).**

Strephodes Pickthornii Salter, Sutherland's Jour. Voyage in Baffin's Bay, etc., 2, 1852, p. 230, pl. 6, fig. 5.—Lambe, Cruise of the "Arctic" in 1908-9, 1910, p. 480.

Cyathophyllum pickthorni Miller, N. A. Geol. Pal., 1889, p. 182, (gen. ref.).

Niagaran: Cape Riley and Beechey. Griffith's and Cornwallis Islands, Arctic America.

***Cyathophyllum plicatum* Goldfuss.**

Not recognized.

Cyathophyllum plicatum Goldfuss, Petrefacta, 1826, p. 54, pl. 15, fig. 12; 2d ed., 1862, pt. 1, p. 51.—Troost, 5th Geol. Rep. Tennessee, 1840, p. 61.—Sherzer, Bull. Geol. Soc. Amer., 3, 1892, p. 254.

Silurian?(?Devonian): Kentucky.

***Cyathophyllum plicatulum* Castelnau.**

Not recognized.

Cyathophyllum plicatulum Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 48, pl. 22, fig. 4.

Silurian: Drummond Island, Lake Huron.

CYATHOPHYLLUM PROFUNDUM Conrad. See *Streptelasma (Petraia) profundum*.

- Cyathophyllum (Calophyllum) pustulatum** Conrad. Not recognized.
Cyathophyllum (Calophyllum) pustulatum Conrad, Proc. Acad. Nat. Sci. Philadelphia, 3, 1846, p. 22, pl. 1, fig. 24.
 Silurian: Ohio.
- Cyathophyllum radicula** Rominger.
Cyathophyllum radicula Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 109, pl. 39, fig. 3.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 86, figs. 1-6.—Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 202, pl. 19, figs. 12-17.
 Niagara: Drummond Island and Point Detour, Michigan; Masonville, Iowa; Louisville, Kentucky, and vicinity.
 Helderbergian (probably Keyser): Near Cumberland, Maryland.
- Cyathophyllum rollinii** Castelnau. Not recognized.
Cyathophyllum Rollinii Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 49, pl. 22, fig. 5.
 Silurian: Drummond Island, Lake Huron.
- Cyathophyllum schucherti** Swartz.
Cyathophyllum schucherti Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 203, pl. 20, figs. 5-9.
 Helderbergian (Keyser): Pinto, Cash Valley, etc., Maryland; Hyndman, Pennsylvania.
- Cyathophyllum sedentarium** Foerste.
Cyathophyllum sedentarium Foerste, Bull. Geol. Surv. Kentucky, 7, 1906, p. 315, pl. 6, figs. 3a-c.
 Clinton (Waco): Near Estill Springs, Panola, and Waco, Kentucky.
- CYATHOPHYLLUM SHUMARDI** Edwards and Haime. See *Amplexus shumardi*.
- Cyathophyllum solitarium** Billings.
Cyathophyllum solitarium Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 93.
 Niagara: Portage Bay, Manitoulin Islands, Lake Huron.
- Cyathophyllum striatulum** Castelnau. Not recognized.
Cyathophyllum striatulum Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 48, pl. 22, fig. 1.
 Silurian (?): Banks of Lakes Huron and Erie.
- CYATHOPHYLLUM TETRAGONUM** Quenstedt. See *Goniophyllum pyramidale*.
- Cyathophyllum thoroldense** Lambe.
Cyathophyllum Thoroldense Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 147, pl. 11, figs. 5, 5a, b.—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 96, pl. 16, fig. 16.
 Niagara (Lockport): Thorold and St. Catharines, Ontario.
 Upper Monroan (Anderdon): Detroit, Michigan.
- Cyathophyllum turbinatum** Owen. Not recognized.
Cyathophyllum turbinatum Owen (not Goldfuss), Geol. Expl. Iowa, Wisconsin and Illinois, 2d ed., 1844, p. 78, pl. 14, fig. 6.
 Niagara: Iowa and Wisconsin.
- CYATHOPHYLLUM UNDATUM ET MULTIPLICATUM** Owen. See *Ptychophyllum expansum*.

- Cyathophyllum vesiculosum* Owen. Not recognized.
Cyathophyllum vesiculosum Owen, Geol. Expl. Iowa, Wisconsin, Illinois, 2d ed., 1844, p. 78, pl. 14, fig. 8.
 Niagaran: Iowa and Wisconsin.
- Cyathophyllum vicinum* Castelnau. Not recognized.
Cyathophyllum vicinum Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 48, pl. 22, fig. 6.
 Silurian(?): Northern New York.
- Cyathophyllum wahlenbergi* Billings.
Cyathophyllum Wahlenbergii Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 108 (adv. sheets, 1862); Cat. Sil. Foss., Anticosti, Geol. Surv. Canada, 1866, p. 34 (loc. ref.).—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 136, pl. 11, figs. 2, 2a, b.
 Anticostian (Becsie River-Gun River): East Point, Anticosti.
- CYATHOSPONGIA** Dawson. See *Cyathophycus* Walcott.
- CYATHOSPONGIA** Hall. Genotype: *C. excrescens* Hall.
Cyathospongia Hall, 35th Rep. New York State Mus. Nat. Hist. (ext. 1882, p. 15), 1884, p. 419.—Miller, N. A. Geol. Pal., 1889, p. 158.
- Cyathospongia excrescens* Hall.
Cyathospongia excrescens Hall, 35th Rep. New York State Mus. Nat. Hist., 1884 (ext. 1882, p. 15), p. 419.
 Niagaran: Falls of the Ohio, and Perry County, Tennessee.
- CYATHOSPONGIA QUEBECENSIS** Dawson and Hinde. See *Cyathophycus quebecensis*.
- CYBELE ELLA** Raymond and Narraway. See *Cybeloides ella*.
- CYBELE MIRUS** Clarke. See *Cybeloides mirus*.
- CYBELE PRIMA** Raymond. See *Cybeloides primus*.
- CYBELE PUNCTATA** Hall. See *Encrinurus ornatus*.
- CYBELE VALCOURENSIS** Raymond. See *Cybeloides primus*.
- CYBELE VIGILANS** Hall. See *Encrinurus vigilans*.
- CYBELE WINCHELLI** Clarke. See *Cybeloides winchelli*.
- CYBELOIDES** Slocum. Genotype: *C. iowensis* Slocum.
Cybeloides Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 63.
- Cybeloides ella* (Raymond and Narraway).
Cybele ella Raymond and Narraway, Annals Carnegie Mus., 3, 1906, p. 598, fig. 1.
Cybeloides ella Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 64.
 Black River: Petite Chaudiere, near Ottawa, Ontario.
- Cybeloides iowensis* Slocum.
Cybeloides iowensis Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 64, pl. 16, figs. 1-4.
 Richmond (Maquoketa): Elgin and Bloomfield, Iowa.
- Cybeloides mirus* (Billings).
Encrinurus mirus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 292, fig. 232.
Cryptonymus mirus Vogdes, Mon. Genera Zethus, etc., 1878, p. 34.

Cybeloides mirus—Continued.

Cybele mirus Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 743.

Chazyan (Quebec—N, P): Table Head, Pistolet Bay, and Portland Creek, Newfoundland.

Cybeloides primus (Raymond).

Glaphurus primus Raymond, Ann. Carnegie Mus., 3, 1905, p. 362, pl. 14, figs. 7, 8.

Cybeloides prima Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, No. 3, 1913, p. 64.

Cybele valcourensis Raymond, Ann. Carnegie Mus., 3, 1905, p. 362, pl. 14, fig. 9.

Cybele prima Raymond and Carraway, Ann. Carnegie Mus., 3, 1906, p. 601.—Raymond, *ibid.*, 7, 1910, p. 75, pl. 19, fig. 19; 7th Rep. State Geol. Vermont, 1910, p. 237, pl. 36, figs. 7–9; pl. 39, fig. 19.

Chazyan (Day Point, Crown Point): Valcour Island, New York.

Cybeloides? winchelli (Clarke).

Cybele winchelli Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 742, fig. 59.

Cybeloides? winchelli Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 64. Trenton (Prosser): Fillmore County, Minnesota.

CYCLASTER Billings. See *Edrioaster* Billings.

CYCLENDOCERAS Grabau and Shimer. See *Endoceras* Hall.

CYCLOCERAS McCoy.

Genotype: *Orthoceras annulare* Fleming.

Cycloceras McCoy, Synop. Carb. Foss. Ireland, 1844, p. 10.—Saemann, *Palaeontographica*, 3, 1852, p. 162.—McCoy, *British Pal. Rocks Foss.*, 1854, p. 318.—Barrande, *Syst. Sil. Centre Boheme*, 2, pt. 3, 1874, p. 770.—Hyatt, *Proc. Boston Soc. Nat. Hist.*, 22, 1884, p. 275; *Zittel-Eastman Textb. Pal.*, 1, 1900, p. 518.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 57.—Hyatt, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 599.

Heloceras Barrande, *Syst. Sil. Centre Boheme*, 2, pt. 3, 1874, p. 773.

Cycloceras amycus (Hall).

Orthoceras amycus Hall, 11th Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 324, pl. 33, figs. 3, 4; *Trans. Albany Inst.*, 10, 1883, p. 74.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1889, p. 541, figs.

Orthoceras (*Cycloceras*) *amycus* Foerste, *Geol. Surv. Ohio*, Pal., 7, 1893, p. 546, pl. 33, fig. 5.

Niagaran (Waldron): Waldron, Indiana; Newsom, Tennessee.

Upper Medinan (Brassfield): Dayton, Ohio.

Cycloceras crocus (Billings).

Orthoceras perannulatum Billings (not Portlock, 1843), *Geol. Surv. Canada*, Rep. Progr. for 1853–56, 1857, p. 319.

Orthoceras Crocus Billings, *Cat. Sil. Foss. Anticosti*, *Geol. Surv. Canada*, 1866, p. 22.

Richmond (English Head) and Gamachian: West End, etc., Anticosti.

Cycloceras inceptum (Foerste).

Orthoceras inceptum Foerste, *Bull. Sci. Lab. Denison Univ.*, 1, 1885, p. 117, pl. 13, figs. 1a–c; *Proc. Boston Soc. Nat. Hist.*, 24, 1889, p. 286.

Orthoceras (*Cycloceras*) *inceptum* Foerste, *Geol. Surv. Ohio*, Pal., 7, 1893, p. 543, pl. 25, figs. 1a–c.

Upper Medinan (Brassfield): Todds Fork near Wilmington and Dayton, Ohio.

Cycloceras inceptum acceleratum (Foerste).

Orthoceras inceptum var. *acceleratum* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 545, pl. 37A, fig. 10.

Upper Medinan (Brassfield): Soldiers' Home, near Dayton, Ohio.

Cycloceras lesueurii (Clarke).

Orthoceras lesueurii Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 785, pl. 53, fig. 4; pl. 55, figs. 8, 9.

Cycloceras lesueurii Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 57, fig. 1256.

Black River (Platteville): Cannon Falls, Minnesota.

Cotypes.—Cat. No. 46528, U.S.N.M.

Cycloceras nicolleti (Clarke).

Orthoceras nicolleti Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 784, pl. 55, figs. 1-2.

Cycloceras nicolleti Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 58, fig. 1258.

Black River (Platteville): Belle Creek, Minnesota.

Cycloceras novacarlisleense (Foerste).

Orthoceras (*Cycloceras*) *novacarlisleensis* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 281, pl. 5, fig. 25; pl. 8, fig. 1; Geol. Surv. Ohio, Pal., 7, 1893, p. 545, pl. 30, fig. 25; pl. 33, fig. 1.

Upper Medinan (Brassfield): Brown's Quarry, near New Carlisle, Ohio.

Cycloceras olorus (Hall).

Orthoceras vertebrae Hall (not Schlotheim), Pal. New York, 1, 1847, p. 201, pl. 43, figs. 5a-c.—Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 328.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 819, fig. 608.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 3, fig. 4.—Hitchcock, Geol. Vermont, 1, 1861, p. 298, fig. 208.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 158, fig.

Orthoceras olorus Hall in Miller's American Pal. Foss., 1877, p. 245.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 554, fig.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 788, pl. 55, figs. 3, 5.

Cycloceras olorus Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 57, fig. 1257. Trenton: Middleville, etc., New York; Wykoff, etc., Minnesota (Prosser).

Black River (Platteville): Mineral Point and Janesville, Wisconsin; St. Charles and Holden, Minnesota.

Cycloceras olorus baffinense (Schuchert).

Orthoceras olorus var. *baffinensis* Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 169, pl. 12, figs. 19-22.

Mohawkian: Head of Frobisher Bay, Baffin Land.

Cotypes.—Cat. No. 28192, U.S.N.M.

Cycloceras perroti (Clarke).

Orthoceras perroti Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 785, pl. 54, figs. 4, 5.

Richmond (Maquoketa): Granger, Minnesota.

Cycloceras? rectiannulatum (Hall).

Orthoceras rectiannulatum Hall, Pal. New York, 1, 1847, p. 34, pl. 7, figs. 2, 2a.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 149.

Cycloceras? (*Spyroceras?*) *rectiannulatum* Ruedemann, Bull. New York State Mus., 90, 1906, p. 506.

Chazy: Clinton County, New York.

Cycloceras teretiforme (Hall).

- Orthoceras teretiforme Hall, Pal. New York, 1, 1847, p. 198, pl. 42, figs. 8a, b.—
Emmons, Amer. Geology, 1, pt. 2, 1855, p. 149.
Orthoceras (Cycloceras) teretiforme Clarke and Ruedemann, Bull. New York State
Mus., 65, 1903, p. 642 (gen. ref.).
Trenton: Watertown, New York.

CYCLOCCELIA Foerste. See *Plectorthis*, subgenus *Encuclodema* Foerste.

CYCLOCONCHA Miller.

Genotype: *C. mediocardinalis* Miller.

- Anodontopsis (part) Meek (not McCoy), Amer. Jour. Sci. Arts, 3d ser., 2, 1871,
p. 297; Pal. Ohio, 1, 1873, p. 140.
Cycloconcha Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 231.—Ulrich, Geol.
Surv. Ohio, 7, 1893, p. 686.—Zittel, Handb. Pal., 2, 1881, p. 103.—Miller,
N. A. Geol. Pal., 1889, p. 474.
Orthodontiscus Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 140.—Cumings, 32d Ann.
Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 983.
Observation.—See Ulrich (1893) for a discussion of the name *Orthodontiscus*.

Cycloconcha mediocardinalis Miller.

- Cycloconcha mediocardinalis Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 231,
figs. 21, 22; N. A. Geol. Pal., 1889, p. 474, fig. 809.—Ulrich, Geol. Surv. Ohio,
7, 1893, p. 686, pl. 48, fig. 12; pl. 51, figs. 14–21.
Eden (Southgate): Cincinnati, Ohio, and vicinity.
Plesiotype.—Cat. No. 46161, U.S.N.M.

Cycloconcha milleri (Meek).

- Anodontopsis? *Milleri* Meek, Amer. Jour. Sci., 3d ser., 2, 1871, p. 297; Geol. Surv.
Ohio, Pal., 1, 1873, p. 140, pl. 12, figs. 1a–d.—Miller, Cincinnati Quart. Jour.
Sci., 1, 1874, p. 227; N. A. Geol. Pal., 1889, p. 462, fig. 775.
Cycloconcha milleri Ulrich, Geol. Surv. Ohio, 7, 1893, p. 686 (gen. ref.).
Orthodontiscus milleri Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana,
1908, p. 1015, pl. 47, figs. 8, 8c.
Richmond (Waynesville): Versailles, Indiana.
Cotypes and *plesiotypes*.—Cat. Nos. 26409, 46162, U.S.N.M.

Cycloconcha oblonga Foerste.

- Cycloconcha oblonga Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 137,
pl. 1, fig. 6.
Trenton (Upper): Near Rogers Gap, Kentucky.

Cycloconcha ovata Ulrich.

- Cycloconcha ovata Ulrich, Geol. Surv. Ohio, 7, 1893, p. 687, pl. 48, figs. 13–15.
Eden (Southgate): Cincinnati, Ohio, and vicinity.
Cotypes.—Cat. No. 46163, U.S.N.M.

CYCLOCRINITES Eichwald.

Genotype: *C. spaskii* Eichwald.

- Cyclocrinites Eichwald, Schicht. Esthland, 1840, p. 192.—Edwards and Haime,
Mon. Polyp. Foss. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, pp. 177,
468.—Eichwald, Leth. Ross. Pal. Russie, 1, 1860, p. 637.—Milne-Edwards,
Hist. Nat. d. Corall., 3, 1860, p. 452.—Niles, Proc. Boston Soc. Nat. Hist., 10,
1855, p. 19.
Cyclocrinus Kayser, Zeits. d. d. geol. Gesell., 27, 1875, p. 780.—Nicholson and
Etheridge, Mon. Sil. Foss. Girvan Dist., 1878, pp. 15, 16.—Roemer, Leth.
geog., 1 Theil, Leth. Pal., Erste Lief., 1880, p. 292.—Zittel, Handb. Pal., 1,
1880, p. 728.—Rauff, Zeits. d. d. geol. Gesell., 40, 1888, p. 609.—Roemer,

CYCLOCRINITES—Continued.

Neues Jahrb. f. Min., Geol. Pal., 1, 1888, p. 74.—Stolley, Archiv. f. Anthropol. Geol. Schleswig-Holsteins, 1, Heft. 2, 1896, pp. 189, 276.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 77.

Observation.—See *Pasceolus* for a probable synonym.

Cyclocrinites spaskii Eichwald.

Cyclocrinites spaskii Eichwald, Ueber Silur. Schicht. Esthland, 1840, p. 192 (German ed.), p. 204 (French ed.); *Urwelt von Russland*, Heft 2, 1842, p. 32, pl. 1, fig. 8; *Leth. Ross. Pal. Russie*, 1, 1860, p. 638, pl. 32, figs. 21a-d.

Cyclocrinus spaskii Eichwald, Bull. Soc. Imp. Nat. Moscou, 29, 1856, p. 124.

Middle Ordovician: Esthonia, Russia. Doubtfully identified in the Appalachian Valley.

CYCLOCRINUS Kayser. See *Cyclocrinites* Eichwald.

CYCLOCRINUS CLAUDII Stolley. See *Pasceolus claudii*.

CYCLOCRINUS DACTYLOIDES Stolley. See *Cerionites dactyloides*.

CYCLOCRINUS DARWINII Stolley. See *Pasceolus darwini*.

CYCLOCRINUS GLOBOSUS Stolley. See *Pasceolus plobosus*.

CYCLOCRINUS GREGARIUS Stolley. See *Nidulites gregarius*.

CYCLOCRINUS HALLI Stolley. See *Pasceolus halli*.

CYCLOCRINUS INTERMEDIUS Stolley. See *Nidulites intermedius*.

CYCLOCRINUS SPASKII Eichwald. See *Cyclocrinites spaskii*.

CYCLOCYSTOIDES Billings and Salter.

Genotype: *C. halli* Billings.

Cyclocystoides Billings and Salter, Geol. Surv. Canada, dec. 3, 1858, p. 86.—Hall, Decrip. new spec. Crin., 1866, p. 10; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 217.—Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 34.—Miller, N. A. Geol. Pal., 1889, p. 237.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 210, fig. 8.—Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 25.

Cyclocystoides anteceptus Hall.

Cyclocystoides anteceptus Hall, Desc. new spec. Crin., etc., 1866, p. 12; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 219.

Black River: Escanaba River, Michigan.

Cyclocystoides bellulus Miller and Dyer.

Cyclocystoides bellulus Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 34, pl. 2, figs. 10, 10a.

Maysville (Fairmount): Cincinnati, Ohio.

Cyclocystoides cincinnatiensis Miller and Faber.

Cyclocystoides cincinnatiensis Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 15, 1892, p. 84, pl. 1, figs. 7, 8.

Maysville (Corryville): Cincinnati, Ohio.

Cyclocystoides halli Billings.

Cyclocystoides Halli Billings, Geol. Surv. Canada, dec. 3, 1858, p. 86, pl. 10 bis, figs. 1-7.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 45 (loc. occ.).—

Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 25, pl. 3, figs. 1, 3, 4.

Trenton (Curdsville): Ottawa, Kirkfield, Hull, and Lake St. John, Canada.

Cyclocystoides huronensis Billings.

Cyclocystoides Huronensis Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 393, fig. 369.—Raymond, Bull. Victoria Mem. Mus., 1, 1913, p. 29, pl. 3, fig. 2.
Richmond: Rabbit Island, Lake Huron.

Cyclocystoides illinoiensis Miller and Gurley.

Cyclocystoides illinoiensis Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 6, 1895, p. 61, pl. 5, figs. 27, 28.—Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 40, pl. 1, fig. 2.
Upper Medinan (Girardeau): Orchard Creek, Alexander County, Illinois.

Cyclocystoides magnus Miller and Dyer.

Cyclocystoides magnus Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 32, pl. 2, figs. 8, 8a.—Miller, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 70, pl. 1, figs. 2, 2a; N. A. Geol. Pal., 1889, p. 237.
Cyclocystoides sp. (?*C. magnus*) Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 15, 1892, p. 85, pl. 1, figs. 13–15.
Richmond (Waynesville): Near Morrow and Waynesville, Ohio.
?Maysville: Cincinnati, Ohio.
Plesiotype.—Cat. No. 40733, U.S.N.M.

Cyclocystoides minus Miller and Dyer.

Cyclocystoides minus Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 33, pl. 2, fig. 5.
Richmond: Morrow, Ohio.

Cyclocystoides mundulus Miller and Dyer.

Cyclocystoides mundulus Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 34, pl. 2, fig. 7.
Richmond: Morrow, Ohio.

Cyclocystoides nitidus Faber.

Cyclocystoides nitidus Faber, Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 17, pl. 1, fig. 1.
Maysville (Corryville): Near Transit, Ohio.

Cyclocystoides parvus Miller and Dyer.

Cyclocystoides parvus Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 33, pl. 2, fig. 6.
Richmond: Morrow, Ohio.

Cyclocystoides salteri Hall.

Cyclocystoides salteri Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 218, pl. 6, fig. 16 (adv. sheets, 1871).—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 211, fig. 8.
Trenton: Near Saratoga, New York.

CYCLOGNATHUS Linnarsson.

Genotype: *C. micropygus* Linnarsson.

Cyclognathus Linnarsson, Geol. Foren. Stockholm Forh., 2, No. 12, 1875, p. 500.—Brøgger, Die sil. Etagen 2–3, Kristiania, 1882, p. 109.—Zittel, Handb. d. Pal., 2, 1885, p. 596.—Koken, Die Leitfossilien, Leipzig, 1896, p. 19.

Cyclognathus rotundifrons Matthew.

Cyclognathus rotundifrons Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 107, pl. 7, figs. 16a, b.
Canadian (Bretonian—Div. C3d): St. John, New Brunswick.

CYCLOGRAPTUS Spencer.Genotype: *C. rotadentatus* Spencer.

Cyclograptus Spencer, Proc. Amer. Assoc. Adv. Sci., 31, 1883, p. 365; Bull. Mus. Univ. State Missouri, 1, 1884, p. 42; Trans. Acad. Sci. St. Louis, 4, 1884, p. 563, 592.—Miller, N. A. Geol. Pal., 1889, p. 182.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 182.

Cyclograptus rotadentatus Spencer.

Cyclograptus rotadentatus Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 592, pl. 6, figs. 6, 6a; Bull. Mus. Univ. State Missouri, 1, 1884, No. 1, p. 42, pl. 6, figs. 6, 6a.—Miller, N. A. Geol. Pal., 1889, p. 182, fig. 162.—Gurley, Jour. Geol., 4, 1896, pp. 94, 309.—Ruedemann, Mem. New York State Mus., 11, 1908, p. 184, pl. 2, fig. 5, figs. 91, 92.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 45, 46, figs. 57, 58.

Niagaran dolomite: Hamilton, Ontario.

(Clinton (Rochester): Clinton, New York.

CYCLOLITES ROTULOIDES Hall. See *Palæocyclus rotuloides*.

CYCLOLITUITES Remele.Genotype: *C. applanatus* Remele.

Cyclolituites Remeles Zeits. d. d. geol. Gesell., 38, 1886, p. 467.—Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 505.

Cyclolituites americanus Hyatt.

Cyclolituites americanus Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 505.

Canadian (Quebec): Gargamelle Cove, Newfoundland.

CYCLONEMA Hall.Genotype: *Pleurotomaria bilix* Conrad.

Cyclonema Hall, Pal. New York, 2, 1853, p. 89.—Salter, Geol. Surv. Canada, Can. Org. Rem., dec. 1, 1859, pp. 23, 25.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 319.—Zittel, Handb. Pal., 2, 1882, p. 187.—Nettelroth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 187.—Miller, N. A. Geol. Pal., 1889, p. 400.—Koken, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 6, 1889, p. 427.—Koken, Die Leitfossilien, Leipzig, 1896, p. 120, fig. 101.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1056.—Koken, Bull. Acad. Imp. Sci. St. Petersburg, 7, 1897, p. 191; Neues Jahrb. f. Min., Geol. Pal., 1, 1898, p. 24.—Pilsbry, Zittel-Eastman Textb. Pal., 1, 1900, p. 448.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 949.—Grabau and Shimer, N. A. Index Fossils, 3, 1909, p. 668.—Dall, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 530.

CYCLONEMA (part) of Hall, Salter and others. See *Trochonema* Salter.

Cyclonema bellulum Billings.

Cyclonema bellula Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 55.

Anticostian (Gun River): The Jumpers, Anticosti.

CYCLONEMA BILEX Foerste. See *Cyclonema daytonense*.

CYCLONEMA BILEX (part) Hall. See *Cyclonema mediale*.

CYCLONEMA BILEX var. *CONICA* Miller. See *Cyclonema bilix*.

CYCLONEMA BILEX var. *LATA* Meek. See *Cyclonema bilix*.

Cyclonema bilix (Conrad).

Pleurotomaria bilix Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 271, pl. 16, fig. 10.—Hall (part), Pal. New York, 1, 1847, p. 305, pl. 83, figs. 4a-e.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 820, fig. 620.

Cyclonema bilix—Continued.

Turbo bilix D'Orbigny, *Prod. de Pal.*, 1, 1849, p. 5 (gen. ref.).—Emmons, *Amer. Geology*, 1, pt. 2, 1855, p. 158.

Cyclonema (*Pleurotomaria*) **bilix** Zittel, *Handb. Pal.*, 2, 1882, p. 188, fig. 234.

Cyclonema bilix Hall, *Pal. New York*, 2, 1852, p. 89 (gen. ref.); 14th Rep. New York State Cab. Nat. Hist., 1861, p. 92.—Billings, *Geol. Canada*, *Geol. Surv. Canada*, 1863, p. 217, fig. 225.—Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, pl. 8, fig. 3.—Miller, *Cincinnati Quart. Jour. Sci.*, 1, 1874, p. 319.—White, 2d Ann. Rep. Indiana Dep. Stat. Geol., 1889, p. 492, pl. 2, figs. 3, 4, 5.—Ulrich, *Amer. Geol.*, 1, 1888, p. 188, footnote.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1889, p. 172, fig.—Miller, *N. A. Geol. Pal.*, 1889, p. 400, fig. 663.—Keyes, *Missouri Geol. Surv.*, 5, 1894, p. 154.—Koken, *Bull. Acad. Imp. Sci. St. Petersburg*, 7, 1897, p. 191, fig. 34.—Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, p. 1058, pl. 58, figs. 35–39.

Cyclonema bilix Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 958, pl. 40, figs. 2–2d.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1909, p. 668, figs. 925 a, b.

Cyclonema bilix lata Meek, *Geol. Surv. Ohio*, *Pal.*, 1, 1873, p. 152, pl. 13, figs. 5e, 5f.—Miller, *Cincinnati Quart. Jour. Sci.*, 1, 1874, p. 320.

Cyclonema bilix conica Miller, *Cincinnati Quart. Jour. Sci.*, 1, 1874, p. 320.

Richmond (Arnheim-Whitewater): **Richmond**, etc., Indiana; Ohio; Kentucky; etc.

Plesiotype.—Cat. Nos. 45763–45765, U.S.N.M. (Ulrich and Scofield).

Cyclonema bilix fluctuatum (James).

Cyclonema fluctuata James, *Cat. L. Sil. Foss. Cincinnati Group*, 1871, p. 8 (nom. nud.); *Cincinnati Quart. Jour. Sci.*, 1, 1874, p. 152.

Cyclonema bilix var. **fluctuatum** Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, p. 1058, pl. 78, figs. 40–42.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 959, pl. 40, figs. 3–3b.

Richmond (Arnheim, Waynesville): Warren and Clinton Counties, Ohio; Indiana; Tennessee.

Plesiotype.—Cat. No. 45767, U.S.N.M.

CYCLONEMA CANCELLATUM Hall. See *Strophostylus cancellatus*.

CYCLONEMA CINCINNATIENSE Miller. See *Cyclonema varicosum*.

Cyclonema commune Billings.

Cyclonema communis Billings, *Cat. Sil. Foss. Anticosti*, *Geol. Surv. Canada*, 1866, p. 55.

Anticostian (Jupiter River, Chicotte): The Jumpers, Anticosti.

Cyclonema cushingi Ruedemann.

Cyclonema cushingi Ruedemann, *Bull. New York State Mus.*, 162, 1912, pl. 7, figs. 8–10.

Trenton (Snake Hill): Snake Hill, Saratoga County, New York.

Cyclonema daytonense Foerste.

Cyclonema bilix Foerste (not Conrad), *Bull. Sci. Lab. Denison Univ.*, 1, 1885, p. 94; *Proc. Boston Soc. Nat. Hist.*, 24, 1889, p. 290, pl. 5, fig. 15; *Geol. Surv. Ohio*, *Pal.*, 7, p. 551, pl. 26, fig. 15, var. p. 130, fig. 15.

Cyclonema daytonensis Foerste, 24th Ann. Rep. Indiana Geol. Nat. Hist. Surv., 1899, p. 77; *Jour. Geol.*, 11, 1903, p. 707.—Savage, *Bull. Geol. Surv. Illinois*, 23, 1913, p. 100, pl. 6, fig. 4; pl. 7, fig. 21.

Upper Medinan: Dayton and Todds Fork, Ohio (Brassfield); Thebes, Illinois; and Edgewood, Missouri (Edgewood).

Cyclonema decorum Billings.

Cyclonema decora Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 56.

Anticostian (Chicotte): Southwest Point, Anticosti.

CYCLONEMA ELEVATA Hall. See *Strophostylus elevatus*.

CYCLONEMA FLUCTUATA James. See *Cyclonema bilix fluctuatum*.

Cyclonema gracile Ulrich.

Cyclonema gracile Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1062, pl. 82, figs. 55-61.

Maysville (Mt. Hope): Cincinnati, Ohio, and vicinity.

Cotypes.—Cat. Nos. 45768, 45769, U.S.N.M.

Cyclonema gracile striatulum Ulrich.

Cyclonema gracile var. *striatulum* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1062, pl. 82, figs. 59-61 (*striatellum* on plate).

Maysville (Mt. Hope): Cincinnati, Ohio, and vicinity.

Holotype.—Cat. No. 45770, U.S.N.M.

Cyclonema hageri Billings.

Cyclonema Hageri Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 178, fig. 169; Pal. Fossils, 1, Geol. Surv. Canada, 1863, p. 29, fig. 27 (adv. sheets 1862).—Miller, N. A. Geol. Pal., 1889, p. 401, fig. 664.

Trenton: Smith's Quarries, Montreal, Quebec.

Cyclonema hallianum Salter.

Cyclonema Halliana Salter, Geol. Surv. Canada, dec. 1, 1859, p. 26, pl. 6, fig. 1.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 178, fig. 168.—Miller, N. A. Geol. Pal., 1889, p. 401, fig. 665.

Black River (Leray): Pauquette's Rapids, Ottawa River, Canada.

Cyclonema humerosum Ulrich.

Cyclonema humerosum Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1061, pl. 78, figs. 43-46.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 960, pl. 40, figs. 5-5c.

Maysville (McMillan) and Richmond: Cincinnati, Ohio, and vicinity; Indiana; Kentucky; Tennessee.

Cotypes.—Cat. Nos. 45771, 45772, U.S.N.M.

CYCLONEMA HUMILIS Billings. See *Diaphorostoma humile*.

Cyclonema inflatum Ulrich.

Cyclonema inflatum Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1060, pl. 78, figs. 31, 32.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

Cotypes.—Cat. No. 45773, U.S.N.M.

Cyclonema (?*Holopea*) **limatum** Ulrich.

Cyclonema (?*Holopea*) *limatum* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1063, pl. 82, figs. 62-64.

Maysville (Fairmount): Cincinnati, Ohio.

Cotypes.—Cat. No. 45774, U.S.N.M.

Cyclonema mediale Ulrich.

Cyclonema bilix Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 151, pl. 13, figs. 5a, c, d (not g).

Cyclonema mediale—Continued.

Cyclonema mediale, Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1059, pl. 78, figs. 29, 30.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 960, pl. 40, figs. 4, 4a.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 669, fig. 925c, d.

Maysville (Fairmount): Cincinnati, Ohio; Kentucky and Indiana.

Cotypes.—Cat. No. 45775, U.S.N.M.

CYCLONEMA MEDIOCRIS Billings. See *Holopea mediocris*.

Cyclonema? minor James.

Not recognized.

Cyclonema? minor James, The Paleontologist, No. 1, 1878, p. 6.

Maysville: Cincinnati, Ohio.

Cyclonema montrealense Billings.

Cyclonema Montrealensis Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 30, text fig. 28. (adv. sheets, 1862); Geol. Canada, Geol. Surv. Canada, 1863, p. 178, fig. 170.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 186, pl. 12, fig. 33.—Ruedemann, Bull. New York State Mus., 162, 1912, p. 110, pl. 7, fig. 7.

Trenton: Island of Montreal, Canada; Snake Hill, Saratoga County, New York (Snake Hill); New Jersey.

CYCLONEMA? NORMALIANA Raymond. See *Gyronema historicum*.

CYCLONEMA? OBSOLETA Hall. See *Holopea obsoleta*.

CYCLONEMA PERCARINATA of authors. See *Gyronema percarinatum*.

Cyclonema percingulatum Billings.

Cyclonema percingulata Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1859, p. 304; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 55 (loc. ref.).

Anticostian (Jupiter River): Southwest Point, Anticosti.

CYCLONEMA PERVETUSTA Whitfield and Hovey. See *Euconia? pervetusta*.

Cyclonema phædra Billings.

Cyclonema Phædra Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 188.

Canadian (Beekmantown): Near St. Antoine above Quebec, Canada

Cyclonema (?*Gyronema*) *præscriptum* Ulrich.

Cyclonema (?*Gyronema*) *præscriptum* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, pl. 78, fig. 26.

Stones River (Murfreesboro): Murfreesboro, Tennessee.

Holotype.—Cat. No. 46052, U.S.N.M.

Cyclonema pyramidatum James.

Cyclonema pyramidata James, Cat. L. Sil. Fossils Cincinnati Group, 1871, p. 8; Cincinnati Quart. Jour. Sci., 1, 1874, p. 152.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1061, pl. 78, figs. 33, 34.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

Plasiotype.—Cat. No. 45776, U.S.N.M.

CYCLONEMA RUGILINEATA Nettelroth. See *Poleumita rugilineata*.

CYCLONEMA SEMICARINATA Salter. See *Gyronema semicarinatum*.

***Cyclonema simulans* Ulrich.**

Cyclonema simulans Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1061, pl. 78, fig. 47.

Maysville (Corryville): Cincinnati, Ohio.

Holotype.—Cat. No. 45777, U.S.N.M.

***Cyclonema sublaeve* Ulrich.**

Cyclonema sublaeve Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1062, pl. 78, figs. 48, 49.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 669, fig. 925j.

Maysville (Mt. Hope): Cincinnati, Ohio, and vicinity

Cotypes.—Cat. No. 45778, U.S.N.M.

CYCLONEMA SULCATA Billings. See *Poleumita? sulcata*.

CYCLONEMA TENNESSEENSE Miller. See *Strophostylus tennesseensis*.

CYCLONEMA TEXTILE Miller. See *Strophostylus textilis*.

***Cyclonema thalia* Billings.**

Pleurotomaria Thalia Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 303.

Cyclonema Thalia Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 17, fig. 5; p. 55.

Richmond (Charleton): Charleton Point, Anticosti.

Gamachian (Ellis Bay): Gamache Bay, Anticosti.

***Cyclonema transversum* Ulrich.**

Cyclonema transversum Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1062, pl. 82, figs. 65-67.

Maysville (Fairmount): Covington, Kentucky, and vicinity.

Cotypes.—Cat. Nos. 45779, 45780, U.S.N.M.

***Cyclonema varians* Billings.**

Cyclonema varians Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 305; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 55 (loc. ref.).

Anticostian (Chicotte): Southwest Point, Anticosti.

***Cyclonema varicosum* Hall.**

Cyclonema varicosa Hall, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 91, 110; Desc. N. Sp. Foss. Cincinnati Group, 1871, pl. 4, figs. 1-3; 24th Rep. New York State Cab. Nat. Hist., 1872, pl. 8, figs. 1, 2.—Meek, Geol. Surv. Ohio, 1, 1873, p. 152.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 321.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1060, pl. 78, figs. 27, 28.—Hayes and Ulrich, U. S. Geol. Surv. Folio 95, illust. sheet, 1903, figs. 28, 29.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 669, fig. 925h-i.—Bassler, Bull. Geol. Surv. Virginia, 2a, 1909, p. 184, fig. 21.

Cyclonema ventricosa (in error for *varicosa*) Hall, 24th Rep. New York State Mus. Nat. Hist., 1870, pl. 8.

Cyclonema cincinnatiense Miller, Journ. Cincinnati Soc. Nat. Hist., 5, 1882, p. 230, pl. 9, figs. 8, 8a-c.

Cyclonema varicosum-cincinnatiense Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 139, pl. 1, figs. 12a, b.

Trenton: Nashville, etc., Tennessee (Catheys); Kentucky; Ohio; Minnesota; Virginia.

Plesiotypes.—Cat. Nos. 45781, 45782, U.S.N.M.

CYCLONEMA VARICOSUM-CINCINNATENSE Foerste. See *Cyclonema varicosum*.

CYCLONEMA VENTRICOSUM Hall. See *Cyclonema varicosum* and *Strophostylus ventricosus*.

CYCLOPORA JAMESII Prout. See *Escharopora pavonia*.

CYCLOPORINA Simpson. See *Semicoscinium* Prout.

CYCLORA Hall.

Genotype: *C. minuta* Hall.

Cyclora Hall, Amer. Jour. Sci. Arts, 48, 1845, p. 294.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 153.—Miller, Cincinnati Quart. Jour. Sci., 1874, p. 312.—Zittel, Handb. Pal., 2, 1882, p. 193.—Miller, N. A. Geol. Pal., 1889, p. 401.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 949.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 673.

Cyclora alta Foerste.

Cyclora alta Foerste, Bull. Sci. Lab. Denison Univ., 1, 1855, p. 96, pl. 14 figs. 17a, b; Geol. Surv. Ohio, Pal., 7, 1893, p. 552, pl. 26, figs. 17a, b.
Upper Medinan (Brassfield): Huffman's Quarry, near Dayton, Ohio.

Cyclora depressa Ulrich.

Cyclora depressa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 13, pl. 7, figs. 9, 9a.
Maysville: Hamilton, etc., Ohio; Indiana; Kentucky.
Cotypes.—Cat. No. 45685, U.S.N.M.

Cyclora hoffmanni Miller.

Cyclora Hoffmanni Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 313, fig. 33; N. A. Geol. Pal., 1889, p. 401, fig. 666.
Mohawkian and Cincinnati: Cincinnati, Ohio, and many other American localities.

Cyclora minuta Hall.

Cyclora minuta Hall, Amer. Jour. Sci. Arts, 48, 1845, p. 294.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 152, pl. 13, figs. 7a-e.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 312.—Whiteaves, Pal. Fossils, Geol. Surv. Canada, 3, pt. 2, 1895, p. 124 (loc. occ.).—Miller, Amer. Geol., 17, 1896, pp. 74-76.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 961, pl. 40, figs. 6-6c.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 673, fig. 932.
Holopea nana Meek, Proc. Acad. Nat. Sci. Philadelphia, 1871, p. 172.
Mohawkian and Cincinnati: Cincinnati, Ohio, and numerous other American localities.

Cyclora parvula (Hall).

Turbo? parvulus Hall, Amer. Jour. Sci. Arts, 48, 1845, p. 294.
Cyclora? parvula Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 154.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 313.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 962.
Mohawkian and Cincinnati: Cincinnati, Ohio, and numerous other American localities.

Cyclora pulcella Miller.

Cyclora pulcella Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 231, pl. 9, figs. 9, 9a-b.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 962, pl. 40, figs. 7-7b.
Richmond (Arnheim, Waynesville): Versailles, Indiana; Ohio; etc.

CYCLOSPIRA Hall and Clarke.Genotype: *Orthis bisulcata* Emmons.

Cyclospira Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 146.—Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 469.—Hall and Clarke, 13th Ann. Rep. New York State Geol., 1895, p. 808.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 760.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 309.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 410.

Cyclospira bisulcata (Emmons).

Orthis bisulcata Emmons, Geol. New York, Rep. 2d Dist., 1842, p. 396, fig. 4.
Atrypa bisulcata Hall, Pal. New York, 1, 1847, p. 139, pl. 33, fig. 3.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 190, pl. 10, figs. 3a-e.
 Genus? *bisulcata* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 63.
Camarella bisulcata Miller, Amer. Pal. Foss., 1877, p. 107.—Leesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 3, figs.
Camarella owatonnensis Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 328, pl. 4, figs. 1-3.
Rhynchonella bisulcata Safford, Geol. Tennessee, 1869, p. 275, figs. 7, 14.
Cyclospira bisulcata? Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 470, pl. 34, figs. 49-54.
Cyclospira bisulcata Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 147, figs. 133-136, pl. 54, figs. 38-40.—Whiteaves, Pal. Foss., 3, pt. 3, 1897, p. 180.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 309, figs. 386d-h.
 Trenton: Adams, Jefferson County, New York; Ottawa, Ontario; Cannon Falls, etc., Minnesota; Lake Winnipeg, Manitoba.

Cyclospira(?) sparsiplica Foerste.

Cyclospira(?) sparsiplica Foerste, Geol. Ohio, 7, 1895, p. 593, pl. 37A, fig. 18.
 Upper Medinan (Brassfield): Dayton, Ohio.

CYCLOSTOMA? PERVETUSTA Conrad. See *Euconia(?) pervetusta*.**CYCLOSTOMICERAS** Hyatt.Genotype: *Gomphoceras cassinense* Whitfield.

Cyclostomiceras Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 530.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 500.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 119.—Hyatt, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 611.

Cyclostomiceras(?) brevicorne (Hall).

Cyrtoceras brevicorne Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 356, pl. 18 (8), figs. 8, 9; rev. ed., 1870, p. 407, pl. 18, figs. 8, 9; pl. 25, fig. 14.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 194, fig.
Cyrtoceras brevicorne Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 89, pl. 13, figs. 11, 12.
Cyclostomiceras(?) brevicorne Grabau and Shimer, N. A. Index Fossils, 3, 1910, p. 121, fig. 1361.
 Niagara: Racine, Wisconsin (Racine and Guelph); Shelby and Rochester, New York (Guelph).

Cyclostomiceras cassinense (Whitfield).

Gomphoceras cassinense Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 322, pl. 29, figs. 1-3.—Seely, Rep. State Geol. Vermont, 7, 1910, pl. 56, fig. 4.
Cyclostomiceras cassinense Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 530.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 501, fig. 56; pl. 37, figs. 1-3; pl. 38, figs. 5, 6.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 120, fig. 1357.
 Canadian (Beekmantown): Fort Cassin, Vermont.

Cyclostomiceras minimum (Whitfield).

Gomphoceras minimum Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 321, pl. 27, figs. 3-5.

Cyclostomiceras minimum Ruedemann, Bull. New York State Mus., 90, 1906, p. 502, pl. 35, figs. 5-6, fig. 57.

Canadian (Beekmantown): Fort Cassin, Vermont.

Cyclostomiceras orodes (Billings).

Cyrtoceras Orodes Billings, Pal. Foss., 1, Geol. Surv. Canada (adv. sheets, 1862), 1865, p. 162.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 103, pl. 14, figs. 7, 7a, 8a, b, 9.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 88, pl. 15, fig. 3-11.

Cyrtoceras (*Cyclostomiceras*) *orodes* Grabau, Michigan, Geol. Surv., Geol. Ser., 1, 1909, p. 197, pl. 28, figs. 6, 7; pl. 29, figs. 2, 3.

Cyclostomiceras orodes Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 120, fig. 1358-60.

Niagaran (Guelph): New Hope, Ontario.

Monroan (Amherstburg and Raisin River): Detroit River region.

CYLLOCRINUS Miller. See *Barrandeocrinus* Angelin.

CYLINDROCCELIA Ulrich.

Genotype: *C. endoceroidea* Ulrich.

Cylindroccelia Ulrich, Amer. Geol., 3, 1889, pp. 235, 245.—Miller, N. A. Geol. Pal., 1889, p. 158.—James, Jour. Cincinnati Soc. Nat. Hist., 14, 1891, p. 56.—

Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 77.

Cylindroccelia covingtonensis Ulrich.

Cylindroccelia covingtonensis Ulrich, Amer. Geol., 3, 1889, p. 247.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1, 1891, p. 56.

Maysville (Fairmount): Covington, Kentucky.

Cotypes.—Cat. No. 46550, U.S.N.M.

Cylindroccelia endoceroidea Ulrich.

Cylindroccelia endoceroidea Ulrich, Amer. Geol., 3, 1889, p. 246, figs. 9, 10.

Black River (Lowville): High Bridge, Kentucky.

Cylindroccelia minnesotensis Ulrich.

Cylindroccelia minnesotensis Ulrich, Amer. Geol., 3, 1889, p. 248.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 78, pl. G, figs. 1-3.

Black River (Decorah): Minneapolis, St. Paul, and Fountain, Minnesota.

Cotypes.—Cat. Nos. 46551, 46552, U.S.N.M.

Cylindroccelia minor Ulrich.

Cylindroccelia minor Ulrich, Amer. Geol., 3, 1889, p. 248.

Trenton: Harrodsburg Junction, Kentucky.

CYLINDROHELIUM Grabau.

Genotype: *C. profundum* Grabau.

Cylindrohelium Grabau, Geol. Surv. Michigan, Geol. Ser., 1, 1909, p. 102.

Cylindrohelium heliophylloides Grabau.

Cylindrohelium heliophylloides Grabau, Geol. Surv. Michigan, Geol. Ser., 1, 1909, p. 103, pl. 10, fig. 7.

Upper Monroan (Lucas): Salt shaft, Detroit, Michigan.

Cylindrohelium profundum Grabau.

Cylindrohelium profundum Grabau, Geol. Surv. Michigan, Geol. Ser., 1, 1909, p. 102, pl. 11, figs. 4-6, 7.

Upper Monroan (Lucas): Salt shaft, Detroit, Michigan; near Sylvania, Ohio.

Silurian: North Fork of Saskatchewan River, Canada.

CYMATONOTA Ulrich.Genotype: *C. typicalis* Ulrich.

Orthonota Conrad (part), New York Ann. Geol. Rep., 1841, p. 51.—Hall, 1847, Pal. New York, 1, 1841, p. 299.

Orthodesma Hall and Whitfield (part), Pal. Ohio, 2, 1875, p. 93.

Chenodorus Ulrich, Geol. Minnesota, 3, pt. 2, 1893, p. 477 (not defined).

Cymatonota Ulrich, Geol. Surv. Ohio, 7, 1893, p. 661.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 980.

Cymatonota attenuata Ulrich.

Cymatonota attenuata Ulrich, Geol. Surv. Ohio, 7, 1893, p. 664, pl. 55, figs. 12-14. Richmond (Waynesville); Waynesville, Ohio.

Cotypes.—Cat. No. 46164, U.S.N.M.

Cymatonota constricta Ulrich.

Cymatonota constricta Ulrich, Geol. Surv. Ohio, 7, 1893, p. 664, pl. 55, figs. 10, 11. Richmond (Waynesville): Butler County, Ohio, and Versailles, Indiana.

Holotype.—Cat. No. 46165, U.S.N.M.

Cymatonota cylindrica (Miller and Faber).

Orthodesma cylindricum Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 22, pl. 1, figs. 1-4.

Richmond (Waynesville): Warren County, Ohio.

Cymatonota lenior Foerste.

Cymatonota lenior Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 290, pl. 1, fig. 9.

Cincinnati (Pulaski): Riviere des Hurons, near St. Jean Baptiste, Quebec.

Cymatonota parallela (Hall).

Orthonota parallela Hall, Pal. New York, 1, 1847, p. 299, pl. 82, fig. 7 (not 7a, b, d).—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 173, pl. 13, fig. 14.—

(?)Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 216, fig. 224.—

(?)Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 221.

(?)*Orthodesma parallela* Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 96.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 565, figs.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, pl. 47, fig. 5.

Cincinnati: Pulaski, Lorraine, etc., New York (Pulaski); Cincinnati, Ohio (Maysville).

Cymatonota pholadis (Conrad).

Pterinea pholadis Conrad, Amer. Geol. Rep. New York, 1838, p. 118.

Orthonota pholadis Hall, Pal. New York, 1, 1847, p. 299, pl. 82, fig. 6.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 174.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 222.

Cymatonota pholadis Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 291, pl. 3, fig. 7.

Cincinnati: Pulaski, etc., New York (Pulaski); (?)Cincinnati, Ohio (Maysville).

Cymatonota productifrons Ulrich.

Cymatonota productifrons Ulrich, Geol. Surv. Ohio, 7, 1893, p. 665, pl. 55, figs. 17, 18.

Orthodesma productifrons Miller, N. A. Geol. Pal., 2d App., 1897, p. 783 (gen. ref.).

Eden (Economy): Covington, Kentucky.

Holotype.—Cat. No. 46166, U.S.N.M.

Cymatonota recta Ulrich.

Cymatonota recta Ulrich, Geol. Surv. Ohio, 7, 1893, p. 662, pl. 55, figs. 8, 9.

Maysville (McMillan): Cincinnati, Ohio, and vicinity.

Cotypes.—Cat. Nos. 46167, 46178, U.S.N.M.

Cymatonota semistriata Ulrich.

Cymatonota semistriata Ulrich, Geol. Surv. Ohio, 7, 1893, p. 663, pl. 55, figs. 6, 7.

Orthodesma semistriatum Miller, N. A. Geol. Pal., 2d App., 1897, p. 784 (gen. ref.).

Richmond (Waynesville): Clarksville and Waynesville, Ohio.

Holotype.—Cat. No. 46169, U.S.N.M.

Cymatonota typicalis Ulrich.

Chaenodomus typicalis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 477, fig. 4 (not defined).

Cymatonota typicalis Ulrich, Geol. Surv. Ohio, 7, 1893, p. 662, pl. 55, figs. 1-5.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 998, pl. 45, figs. 1-1c.

Richmond (Waynesville): Waynesville, etc., Ohio; southeastern Indiana.

Cotypes.—Cat. No. 46170, U.S.N.M.

CYPHASPIS Burmeister.

Genotype: *Phacops ceratophthalma* Goldfuss.

Cyphaspis Burmeister, Org. Tril., Ray Soc., 1846, p. 98.—Hawle and Corda, Abh. d. k. böhmischen Gesell. d. Wiss., 5 (extract), 1847, p. 80, pl. 4, fig. 40.—Barrande, Syst. Sil. du Centre Boheme, 1, 1852, p. 479.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 497.—Nieszkowski, Archiv. f. Naturk. Liv.-Ehst-u. Kurl., 1, 1857, p. 562.—Alth, Abhandl. der k.-k. Geol. Reichsanstalt, 7, Heft 1, 1874, p. 61.—Ehlert, Bull. Soc. d'Etudes Sci. d'Angers, 1885, p. 3.—Zittel, Handb. Pal., 2, Munich, 1885, p. 624.—Hall and Clarke, Pal. New York, 7, 1888, p. 47, 48, fig.—Clarke, Jour. Morph., 2, 1888, p. 254.—Whidborne, Mon. Dev. Fauna South England, 1, Pal. Soc. 1889, p. 17.—Miller, N. A. Geol. Pal., 1889, p. 541.—Koken, Die Leitfossilien, Leipzig, 1896, p. 24, fig. 15, fig. 5.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 317.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, p. 26.—Grabau and Shimer, N. A. Index Fossils, 2, 1906, p. 302.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 721.

Cyphaspis arkansanus Van Ingen.

Cyphaspis arkansanus Van Ingen, School of Mines Quart., 23, 1901, p. 85 (nom. nud.).

Niagaran (St. Clair): St. Clair Spring, Independence County, Arkansas.

CYPHASPIS BREVIMARGINATUS Walcott. See *Haploconus brevimarginatus*.**Cyphaspis christyi** Hall.

Cyphaspis christyi Hall, Trans. Albany Inst., 4, 1864, p. 220; 28th Rep. New York St. Mus. Nat. Hist., doc. ed., 1877, pl. 32, figs. 5-7; Mus. ed., 1879, p. 188, pl. 32, figs. 5-7.—White, 2d Ann. Rep. Dep. State Geol., Indiana, 1880, p. 498, pl. 3, fig. 9.—Hall, 11th Rep. Dep. Geol. Nat. Hist. Indiana, 1882, p. 333, pl. 34, figs. 5-7.—Miller, N. A. Geol. Pal., 1889, p. 541, fig. 990.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 174, figs.

Niagaran (Waldron): Waldron, Indiana; Newsom, Tennessee.

CYPHASPIS CLINTONENSIS Foerste. See *Cyphaspis clintoni*.**Cyphaspis clintoni** Foerste.

Proetus — Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 92, pl. 8, fig. 5.

Cyphaspis clintoni Foerste, Proc. Bost. Soc. Nat. Hist., 24, 1890, p. 272, pl. 6, fig. 22.

Cyphaspis clintoni—Continued.

Cyphaspis clintonensis Foerste, Geol. Surv. Ohio, 7, 1893, p. 524, pl. 27, fig. 5; pl. 31, fig. 22.

Upper Medinan (Brassfield): Dayton, Ohio; Cumberland Gap, Tennessee.

Cyphaspis(?) frobisheri Emerson.

Cyphaspis? *frobisheri* Emerson, Narrative Hall's 2d Arctic Exped., U. S. Navy Dep., 1879, p. 583, fig. 11.

Richmond (Utica?): Frobisher Bay, Baffin Land.

Plastotype.—Cat. No. 60627, U.S.N.M.

CYPHASPIS GALENENSIS Clarke. See *Haploconus galenensis*.

Cyphaspis girardeauensis Shumard.

Cyphaspis girardeauensis Shumard, 1st and 2d Ann. Rep. Geol. Surv. Missouri, pt. 2, 1855, p. 197, pl. B, fig. 11 a, b.—Emmons, Man. Geol., 1860, p. 159, fig. 2.—Keyes, Missouri Geol. Surv., 4, 1895, p. 228, pl. 32, fig. 2.—Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 58, pl. 2, fig. 13.—Miller, N. A. Geol. Pal., 1889, p. 541, fig. 991.

Calymene spinifera Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 277.

Upper Medinan (Girardeau): Near Cape Girardeau, Missouri.

Holotype.—Cat. No. 57102, U.S.N.M.

CYPHASPIS HUDSONICA Ruedemann. See *Proetus undulostriatus*.

Cyphaspis intermedia Weller.

Cyphaspis intermedia Weller, Bull. Chicago Acad. Sci., 4, pt. 2, 1907, p. 231, pl. 20, figs. 3-5.—Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 121, pl. 7, fig. 26.

Upper Medinan: Near Channahon, Will County (Channahon), and Thebes, Illinois; Edgewood, Missouri (Edgewood).

Cyphaspis matutina Ruedemann.

Cyphaspis matutina Ruedemann, Bull. New York State Mus., 49, 1901, p. 62, pl. 4, figs. 5-7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 302.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

Cyphaspis spinulocervix Van Ingen.

Cyphaspis spinulocervix Van Ingen, School of Mines Quart., 23, 1901, p. 35, (nom. nud.).

Niagaran (St. Clair): St. Clair Spring, Independence County, Arkansas.

Cyphaspis trentonensis Weller.

Cyphaspis trentonensis Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 197, pl. 15, figs. 8-10.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 302.

Trenton: Jacksonburg, New Jersey.

CYPHOCRINUS Miller.

Genotype: *C. gorbyi* Miller.

Cyphocrinus Miller, 18th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1894, p. 304. (adv. sheets, 1892); N. A. Geol. Pal., 2d. App., 1897, p. 741.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 199.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, p. 75, fig. 37 (includes discussion of synonymy).—Zittel, Grundsätze Pal., 1, 1910, p. 161.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 187.

Hyptiocrinus Wachsmuth and Springer, Amer. Geol., 10, 1892, p. 138; Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 200.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 145.

Cyphocrinus chicagoensis Weller.

Cyphocrinus chicagoensis Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 76, pl. 1, figs. 1-4.

Niagaran (Racine): Bridgeport, Illinois.

Cyphocrinus gorbyi Miller.

Cyphocrinus gorbyi Miller, N. A. Geol. Pal., 1st App., 1892, p. 676, figs. 1221-22; 18th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1894, p. 305, pl. 7, figs. 14-16; adv. sheets, 1892, p. 51, pl. 7, figs. 14-16.

Hyptiocrinus typus Wachsmuth and Springer, Amer. Geol., 10, 1892, p. 138; Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 201, pl. 19, figs. 6 a-c.

Niagaran (Laurel): St. Paul, Shelby County, Indiana.

CYPHOTRYPA Ulrich and Bassler. Genotype: *Leptotrypa acervulosa* Ulrich.

Cyphotrypa Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, pp. 24, 29.

Cyphotrypa acervulosa (Ulrich).

Leptotrypa acervulosa Ulrich, Geol. Minnesota, 3, 1893, p. 318, pl. 27, figs. 24, 25.

Cyphotrypa acervulosa Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 30, pl. 8, figs. 1-3.

Trenton: Decorah, Iowa; Goodhue County, Minnesota (Prosser); Burgin and Frankfort, Kentucky; Ontario.

Holotype.—Cat. No. 43189, U.S.N.M.

Cyphotrypa bulbosa (Billings).

Stenopora bulbosa Billings, Canadian Nat. Geol., 2d ser., 2, 1865, p. 429; Catal. Sil. Foss. Anticosti, 1866, p. 32.

Gamachian (Ellis Bay): Gamache Bay, etc., Anticosti.

Cyphotrypa corrugata (Weller).

Monotrypa corrugata Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 223, pl. 18, figs. 1-5.

Cyphotrypa corrugata Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 269, pl. 42, figs. 5-9; pl. 44, fig. 4; pl. 52, figs. 1, 2.

Helderbergian: Near Tri States, New York (Decker Ferry); Cash Valley, etc., Maryland (Keyser).

Plesiotypes.—Cat. No. 53651, U.S.N.M.

Cyphotrypa frankfortensis Ulrich and Bassler.

Cyphotrypa frankfortensis Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 30, pl. 8, figs. 7-9.

Trenton (Cynthiana): Frankfort and Burgin, Kentucky.

Holotype.—Cat. No. 43188, U.S.N.M.

Cyphotrypa informis (Ulrich).

Leptotrypa informis Ulrich, Geol. Minnesota, 3, 1893, p. 317, pl. 27, figs. 22, 23.

Cyphotrypa informis Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 30 (gen. ref.).

Black River (Decorah): Minneapolis and St. Paul, Minnesota.

Cyphotrypa semipilaris (Ulrich).

Leptotrypa semipilaris Ulrich, Geol. Surv. Illinois, 8, 1890, p. 457, pl. 36, figs. 5-5d.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 181.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 580, fig. 148 (not 149, 150—*Leptotrypa acervulosa*).

Cyphotrypa semipilaris Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 30 (gen. ref.).

Maysville (Fairmount): Covington, Kentucky, and vicinity.

Cotypes.—Cat. No. 43395, U.S.N.M.

Cyphotrypa stidhami (Ulrich).

Leptotrypa stidhami Ulrich, Geol. Surv. Illinois, 8, 1890, p. 456, pl. 36, figs. 4-4b.
Monticulipora stidhami J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 76.

Cyphotrypa stidhami Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, p. 30 (gen. ref.).

Richmond (Whitewater): Brown County, and near Eaton, Ohio.

Cotypes.—Cat. No. 43394, U.S.N.M.

Cyphotrypa wilmingtonensis Ulrich and Bassler.

Cyphotrypa wilmingtonensis Ulrich and Bassler, Smiths. Misc. Coll., Quart., 47, 1904, p. 31, pl. 8, figs. 4-6.

Richmond (Fernvale): Wilmington, Illinois.

Holotype.—Cat. No. 43192, U.S.N.M.

CYPRICARDIA ALATA Hall. See *Modiolopsis primigenia*.

CYPRICARDIA AMERICANA Emmons. See *Goniophora carinata*.

CYPRICARDIA? **ANGUSTA** Hall. See *Ctenodonta machseriformis*.

CYPRICARDIA MODIOLARIS Owen. See *Modiolopsis modiolaris*.

CYPRICARDIA OBSOLETA Hall. See *Modiolopsis subalatus*.

CYPRICARDIA ORTHONOTA Hall. See *Modiolopsis orthonota*.

CYPRICARDIA SUBTRUNCATA Emmons. See *Whitella subtruncata*.

CYPRICARDINIA Hall.

Genotype: *C. lamellosa* Hall.

Cypricardina Hall, Pal. New York, 3, 1859, p. 266; Prelim. Notice Lam., pt. 2, 1870, p. 81; 23d Rep. New York State Cab. Nat. Hist., 1873, pl. 14, figs. 3-6.—Barrande, Syst. Sil. Centre Boheme, 1881, p. 14, 112.—Zittel, Handb. Pal., 2, 1881, p. 108.—Hall, Pal. New York, 5, pt. 1, Lam., 2, 1885, p. xlvii.—Herrick, Bull. Sci. Lab. Denison Univ., 2, pt. 1, 1889, p. 35.—Miller, N. A. Geol. Pal., 1889, p. 475.—Nettelroth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 204.—Whidborne, Mon. Dev. Fauna South England, 2, Pal. Soc., 1892, p. 5.—Koken, Die Leitfossilien, Leipzig, 1896, p. 524.—Hind, Mon. Brit. Carb. Lamellibranchiata, 1, Pal. Soc., 1897, p. 129.—Grabau, Bull. Buffalo Soc. Nat. Hist., 6, 1889, p. 268.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 535.

Cypricardina arata Hall.

Cypricardina arata Hall, 20th Rep. New York State Cab. Hist., 1868, p. 337, pl. 14 (5), fig. 6; rev. ed., 1870, p. 385, pl. 14, fig. 6; 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 174; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 317, pl. 27, fig. 23.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 535.

Niagaran: Racine, Wisconsin, and Bridgeport, Illinois (Racine); Waldron, Indiana; Tennessee (Waldron).

Cypricardina canadensis Grabau.

Cypricardina canadensis Grabau, Geol. Surv. Michigan, Geol. Ser., 1, 1909, p. 170, pl. 23, figs. 14, 15.

Upper Monroan (Amherstburg): Bed of Detroit River, opposite Amherstburg, Ontario.

CYPRICARDINIA INFLATA Lesley. See *Cypricardites inflatus*.

Cypricardinia lamellosa Hall.

Cypricardinia lamellosa Hall, Pal. New York, 3, 1850, p. 266, pl. 49a, figs. 1a-c.

Cypricardinia cf. *lamellosa* Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 463, pl. 78, figs. 6, 7.

Helderbergian: Albany County, New York (New Scotland); Keyser, West Virginia (Keyser).

Cypricardinia subovata Miller and Dyer.

Cypricardinia subovata Miller and Dyer, Cont. to Pal., 2, 1878, p. 10, pl. 3, figs. 8, 8a.

Niagaran (Waldron): Waldron, Indiana.

Cypricardinia subquadrata Savage.

Cypricardinia subquadrata Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 95, pl. 5, fig. 26.

Upper Medinan (Edgewood-Noix): Near Louisiana, Missouri.

Cypricardinia undulostriata (Hall).

Modiolopsis? *undulostriata* Hall, Pal. New York, 2, 1852, p. 284, pl. 59, figs. 6a, b.

Cyrtodonta undulostriata Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 410.

Cypricardinia undulostriata Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 561, pl. 37, figs. 9a, b.

Clinton (Rochester): Lockport, New York.

Upper Medinan (Brassfield): Dayton, Ohio.

Cypricardites Conrad.

Genotype: *C. curtus* Conrad.

Cypricardites Conrad, 5th Ann. Rep. New York Geol. Surv, 1841, p. 51.

Not *Cypricardites* of most authors.

Observation.—See Geology of Minnesota, 2, 1897, p. 535, for remarks on this genus.

CYPRICARDITES of authors. See *Cyrtodonta* Billings, *Ortonella* Ulrich, and *Vanuxemia* Billings.

CYPRICARDITES ACUTUMBONA Miller. See *Vanuxemia acutumbona*.

CYPRICARDITES AFFINIS Miller. See *Cyrtodonta affinis*.

CYPRICARDITES AMPLUS Miller. See *Cyrtodonta ampla*.

CYPRICARDITES AMYGDALINA Miller. See *Ambonychia amygdalina*.

CYPRICARDITES ANGUSTA Miller. See *Ctenodonta machæriiformis*.

CYPRICARDITES ANGUSTIFRONS Conrad. See *Modiolopsis modiolaris*.

CYPRICARDITES ANODONTOIDES Emmons. See *Modiolopsis sinuata*.

CYPRICARDITES ANTICOSTIENSIS Miller. See *Cyrtodonta?* *anticostiensis*.

CYPRICARDITES BILLINGSI Miller. See *Cyrtodonta billingsi*.

CYPRICARDITES BREVIUSCULA Miller. See *Cyrtodonta breviuscula*.

CYPRICARDITES CANADENSIS Miller. See *Cyrtodonta canadensis*.

CYPRICARDITES? CARINATA Meek. See *Whitella carinata*.

CYPRICARDITES CASWELLI Foerste. See *Cuneamya caswelli*.

CYPRICARDITES CINGULATA Ulrich. See *Cyrtodonta cingulata*.

CYPRICARDITES CORDIFORMIS Miller. See *Plethocardia?* *cordiformis*.

Cypricardites curtus Conrad.

Not recognized.

Cypricardites curta Conrad, 5th Ann. Rep. New York Geol. Surv., 1841, p. 53.
Salmon River: Near Rome, New York, and Richmond, Indiana.

Observation.—Foerste (Bull. Sci. Lab. Denison Univ., 17, 1914, p. 298) attempts to resurrect this form as a species of *Ischyrodonta* with the well-known *I. unionoides* as a synonym. Conrad's definition is worthless, and the figures given by Hall (12th Rep. New York State Cab. Nat. Hist., 1859, p. 9) is a view of the interior of some unknown *Cyrtodonta*.

CYPRICARDITES DESCRIPTUS Sardeson. See *Cyrtodonta descriptus*.

CYPRICARDITES DIGNUS Sardeson. See *Cyrtodonta dignus*.

CYPRICARDITES EMMA Miller. See *Rhytimya emma*.

CYPRICARDITES FERRUGINEUM Hall and Whitfield. See *Cyrtodonta? ferruginea*.

CYPRICARDITES FINITIMUS Sardeson. See *Cyrtodonta finitimus*.

CYPRICARDITES (VANUXEMIA) FRAGOSA. See *Vanuxemia fragosa*.

CYPRICARDITES GANTI Miller. See *Modiolodon ganti*.

CYPRICARDITES GERMANUS Ulrich. See *Cyrtodonta grandis germana*.

CYPRICARDITES GLABELLA Ulrich. See *Cyrtodonta glabella*.

CYPRICARDITES GRANDIS Ulrich. See *Cyrtodonta grandis*.

CYPRICARDITES HAINESI Miller and Faber. See *Ortonella hainesi*.

CYPRICARDITES HALLI Nettelroth. See *Cyrtodonta halli*.

CYPRICARDITES HARRIETTA Miller. See *Cyrtodonta? harrietta*.

CYPRICARDITES HAYNIANUS Ulrich. See *Vanuxemia hayniana*.

CYPRICARDITES HINDI Miller. See *Whitella hindi*.

CYPRICARDITES HURONENSIS Miller. See *Cyrtodonta huronensis*.

Cypricardites inflatus (Emmons).

Not recognized.

Nuculites inflata Emmons, Nat. Hist. Geol. New York, 2, 1842, p. 395, fig. 2.

Cypricardites inflatus Miller, N. A. Geol. Pal., 1889, p. 476 (gen. ref.).

Cypricardinia inflata Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 177.
figs.

Trenton: Watertown, New York.

CYPRICARDITES INSULARIS Miller. See *Cyrtodonta? insularis*.

Cypricardites iowensis (Owen).

Cardium iowensis Owen, Geol. Expl. Iowa, Wisconsin, Illinois, 2d ed., 1844, p. 84, pl. 17, fig. 8.

Cypricardites iowensis Miller, N. A. Geol. Pal., 1889, p. 477 (gen. ref.).

Mohawkian: Iowa and Wisconsin.

Observation.—Side view of cast of some unrecognizable pelecypod.

CYPRICARDITES ISLANDICUS Hall. See *Cyrtodonta huronensis*.

CYPRICARDITES LATUS Miller. See *Modiolopsis latus*.

CYPRICARDITES LEUCOTHEA Miller. See *Cyrtodonta leucothea*.

- CYPRICARDITES LUCULENTUS** Sardeson. See *Cyrtodonta grandis luculenta*.
- CYPRICARDITES MEGAMBONUS** Whitfield. See *Whitella megambona*.
- CYPRICARDITES MINNESOTENSIS** Sardeson. See *Cyrtodonta glabella*.
- CYPRICARDITES MISENERI** Miller. See *Ischyrodonta miseneri*.
- CYPRICARDITES? MODESTUS** Ulrich. See *Saffordia modesta*.
- CYPRICARDITES MODIOLARIS** Emmons. See *Modiolopsis modiolaris*.
- CYPRICARDITES NANUS** Ulrich. See *Vanuxemia nana*.
- CYPRICARDITES NASUTA** Conrad. See *Orthodesma nasutum*.
- CYPRICARDITES NIOTA** Hall and Whitfield. See *Vanuxemia niota*.
- CYPRICARDITES OBLIQUUS** Meek and Worthen. See *Cyrtodonta obliqua*.
- CYPRICARDITES OBSOLETUS** Lesley. See *Modiolopsis subalatus*.
- CYPRICARDITES OBTUSIFRONS** Ulrich. See *Vanuxemia obtusifrons*.
- CYPRICARDITES OBTUSUS** Miller. See *Cyrtodonta obtusa*.
- CYPRICARDITES OVALIS** Miller. See *Ischyrodonta ovalis*.
- CYPRICARDITES OVATA** Conrad. See *Modiolopsis modiolaris*.
- CYPRICARDITES OVIFORMIS** Ulrich. See *Cyrtodonta oviformis*.
- CYPRICARDITES PERSIMILIS** Miller. See *Cyrtodonta persimilis*.
- CYPRICARDITES PLEBEIA** Miller. See *Whitella plebeia*.
- CYPRICARDITES PONDEROSA** Miller. See *Cyrtodonta ponderosa*.
- CYPRICARDITES QUADRANGULARIS** Whitfield. See *Whitella quadrangularis*.
- Cypricardites?? quadrilatera** Hall.
Cypricardites? quadrilatera Hall, 20th Rep. New York State Cab. Hist., 1868, p. 340, pl. 14 (5), figs. 8-10; rev. ed. 1868 (1870), p. 388, pl. 14, figs. 8-10.
 Niagaran (Racine): Bridgeport, Illinois.
- CYPRICARDITES RECTIROSTRIS** Whitfield. See *Vanuxemia rectirostris*.
- CYPRICARDITES ROTUNDATA** Hall and Whitfield. See *Vanuxemia rotundata*.
- CYPRICARDITES ROTUNDATUS** (part) Whitfield. See *Vanuxemia suberecta*.
- CYPRICARDITES RUGOSUS** Miller. See *Cyrtodonta rugosa*.
- CYPRICARDITES SAFFORDI** Hall. See *Cyrtodonta saffordi*.
- CYPRICARDITES SARDESONI** Ulrich. See *Vanuxemia sardesoni*.
- CYPRICARDITES SIGMOIDEA** Miller. See *Whitella? sigmoidea*.
- CYPRICARDITES SINUATA** Emmons. See *Modiolopsis sinuata*.
- CYPRICARDITES SPINIFERA** Miller. See *Cyrtodonta spinifera*.
- CYPRICARDITES STERLINGENSIS** Miller. See *Whitella sterlingensis*.
- CYPRICARDITES SUBANGULATUS** Miller. See *Cyrtodonta subangulata*.

CYPRICARDITES SUBCARINATA Miller. See *Cyrtodonta subcarinata*.

CYPRICARDITES SUBOVATUS Miller. See *Cyrtodonta huronensis*.

CYPRICARDITES SUBSPATULATA Miller. See *Prolobella subspatulata*.

CYPRICARDITES SULCODORSATUS Miller. See *Saffordia sulcodorsata*.

CYPRICARDITES TENELLUS Ulrich. See *Cyrtodonta tenella*.

CYPRICARDITES TERMINALIS Ulrich. See *Vanuxemia terminalis*.

CYPRICARDITES TRIANGULARIS Sardeson. See *Vanuxemia hayniana*.

CYPRICARDITES UNGULATA Miller. See *Vanuxemia unguata*.

CYPRICARDITES VENTRALIS Miller. See *Saffordia ventralis*.

CYPRICARDITES VENTRICOSA Miller. See *Whitella ventricosa*.

CYPRICARDITES VENTRICOSUS Whitfield. See *Cyrtodonta billingsi*.

CYPRICARDITES VETUSTA Miller. See *Cuneamya vetusta*.

CYPRICARDITES VICINUS Sardeson. See *Vanuxemia obtusifrons*.

CYPRICARDITES WINCHELLI Miller. See *Modiolodon winchelli*.

CYPRICARDITES WORTHENI Ulrich. See *Vanuxemia wortheni*.

CYPRIDINA Milne-Edwards.

Cypridina Milne-Edwards in Lamarck's *Anim. sans Vert.*, 5, 1838, p. 178.—Miller, *N. A. Geol. Pal.*, 1st App., 1892, p. 706.—Baesler, *Zittel-Eastman Textb. Pal.*, 1913, p. 741.

Cypridina antiqua Jones.

Cypridina antiqua Jones, *Geol. Mag.*, dec. 5, 1, 1904, p. 438, fig. 1.
Trenton?: Wenoma, Lake Ontario, near Hamilton, Ontario.

CYRTACTINOCERAS Hyatt.

Genotype: *Cyrtoceras rebelle* Barrande.

Cyrtactinoceras Hyatt, *Zittel-Eastman Textb. Pal.*, 1900, p. 528; *ibid.*, 2d ed., 1913, p. 609.—Ruedemann, *Bull. New York State Mus.*, 90, 1906, p. 448.

Cyrtactinoceras boycei (Whitfield).

Cyrtoceras boycei Whitfield, *Bull. Amer. Mus. Nat. Hist.*, 1, 1886, p. 326, pl. 29, fig. 4.—Brainerd and Seely, *Bull. Amer. Mus. Nat. Hist.*, 3, 1890, p. 22.

Cyrtactinoceras boycei Ruedemann, *Bull. New York State Mus.*, 90, 1906, p. 489, pl. 35, figs. 1-4; figs. 45-47.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 117, fig. 1352.

Chazy (Crown Point, Valcour): Isle La Motte, Vermont.

Cyrtactinoceras champlainense Ruedemann.

Cyrtactinoceras champlainense Ruedemann, *Bull. New York State Mus.*, 90, 1906, p. 491, pl. 34, fig. 3; pl. 36, figs. 1, 2, figs. 48-50.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 117.

Chazy (Valcour): Near Chazy, and Saranac River at Plattsburg, New York.

CYRTENDOCERAS Remele.

Cyrtendoceras (Remele) Hyatt, *Zittel-Eastman Textb. Pal.*, 1, 1900, p. 515; 2d ed., 1913, p. 598.

***Cyrtendoceras(?) priscum* Ruedemann.**

Cyrtendoceras(?) priscum Ruedemann, Bull. New York State Mus., 90, 1906, p. 430, pl. 2, figs. 2-5.

Canadian (Beekmantown): Beekmantown, New York.

CYRTHIA D'Orbigny. See *Cyrtia* Dalman.**CYRTIA Dalman.**

Genotype: *Anomites exporrectus* Wahlenberg.

Cyrtia Dalman, Kongl. Svenska Vet.-Akad. Handl. for 1827, 1828, pp. 93, 97.—Davidson, British Foss. Brach. Pal. Soc., 1853, p. 83; 1859, p. 66.—Billings, Canadian Jour., 6, 1861, p. 262.—Zittel, Handb. Pal., 1, 1880, p. 683.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 93.—Miller, N. A. Geol. Pal., 1889, p. 342.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 40; 13th Ann. Rep. New York State Geol., 1895, p. 759.—Koken, Die Leitfossilien, Leipzig, 1896, p. 243, fig. 204, 3.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 336; 2d ed., 1913, p. 412.

Cyrtia D'Orbigny, Prodr. Pal., 1, 1849, p. 41.

***Cyrtia cliftonensis* Foerste.**

Cyrtia cliftonensis Foerste, Jour. Geol., 11, 1903, p. 709; Bull. Sci. Lab. Denison Univ., 14, 1909, p. 91, pl. 2, fig. 32.

Niagaran (Brownsport): Near Clifton, Tennessee.

CYRTIA EXPORRECTA Hall and Whitfield, 1875. See *Cyrtia exporrecta myrtia*.***Cyrtia exporrecta* (Wahlenberg).**

Anomites exporrectus Wahlenberg, Nova Acta Regias Soc. Scient. Upsal, 8, 1821, p. 64.

Spirifera (*Cyrtia*) *trapezoidalis* Hall and Whitfield, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 183.

Cyrtia trapezoidalis Hall and Whitfield, 27th Rep. *ibid.*, 1875, pl. 9, figs. 19-21.

Cyrtia exporrecta Dalman, Kongl. Vet.-Akad. Handl. for 1827, 1828, p. 118.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 93, pl. 27, figs. 6-8, 20.—Miller, N. A. Geol. Pal., p. 342, 1889, fig. 557.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 42, pl. 28, figs. 1, 48, 49, 51.

Silurian: Europe; Louisville, Kentucky (Louisville); Osgood, Indiana (Osgood). *Plesiotype*.—Cat. No. 51326, U.S.N.M.

CYRTIA EXPORRECTA VAR. ARRECTA Nettelroth. See *Cyrtia exporrecta myrtia*.***Cyrtia exporrecta myrtia* (Billings).**

Cyrtia myrtia Billings, Pal. Fossils, 1, 1862, p. 165, fig. 149.—Hall and Clarke Pal. New York, 8, pt. 2, 1893, p. 42.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 443, pl. 9, figs. 10, 12.

Cyrtia trapezoidalis var. *arrecta* Hall and Whitfield, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 183.

Cyrtia exporrecta Hall and Whitfield, 27th Rep. *ibid.*, 1875, pl. 9, figs. 22, 23.

Cyrtia exporrecta var. *arrecta* Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 94, pl. 27, fig. 21; pl. 34, fig. 35; pl. 37, figs. 60, 61.—Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 28, figs. 2, 3; pl. 39, fig. 32.

Anticostian (Chicotte): Southwest Point, Anticosti.

Niagaran: Louisville, Kentucky (Louisville); Indiana and Tennessee (Osgood and Waldron); Wisconsin (Racine).

Plesiotype.—Cat. No. 51327, U.S.N.M. (Nettelroth types of *C. exporrecta-arrecta*).

Cyrtia meta (Hall).

Spirifer radiatus (part) Hall, Pal. New York, 2, 1852, p. 66, pl. 22, figs. 2a-2c, 2d.
Spirifera meta Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 372, pl. 13, figs. 12, 13.

Cyrtia radians Hall and Clarke, Pal. New York, 8, pt. 2, 1893, pp. 42, 362, pl. 28, figs. 4, 5, 50, 52; pl. 39, fig. 33.

Niagaran: Rochester, New York (Clinton); Milwaukee, Wisconsin (Racine).

CYRTIA MYRTIA Billings. See *Cyrtia exporrecta myrtia*.

CYRTIA RADIANs Hall and Clarke. See *Cyrtia meta*.

CYRTIA TRAPEZOIDALIS var. **ARRECTA** Hall and Whitfield. See *Cyrtia exporrecta myrtia*.

CYRTIDOCRINUS Angelin. See *Lecanocrinus* Hall.

CYRTINA Davidson.

Genotype: *Cyrtia heteroclita* Defrance.

Cyrtina Davidson, Mon. British Carb. Brach. Pal. Soc., 1859, p. 66.—Hall, Pal. New York, 4, 1867, p. 263; 20th Rep. New York State Cab. Nat. Hist., 1867, p. 251.—Zittel, Handb. d. Pal., 1, 1890, p. 633.—Davidson, Mon. British Foss. Brach., 5, Sil. Suppl., Pal. Soc., 1882, p. 80.—Herrick, Bull. Sci. Lab. Denison Univ., 4, 1888, p. 14.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 95.—Miller, N. A. Geol. Pal., 1889, p. 342.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 43; 13th Ann. Rep. New York State Geol., 1895, p. 763.—Koken, Die Leitfossilien, Leipzig, 1896, p. 243, figs. 204, 6.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 219.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 335, 2d ed., 1913, p. 412.—Grabau, Bull. New York State Mus., 45, 1901, p. 197; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 197.

Cyrtina magnaplicata Weller.

Cyrtina magnaplicata Weller, Geol. Surv. New Jersey Pal., 3, 1903, p. 238, pl. 21, figs. 46-49.

Helderbergian (Decker Ferry): Two miles south of Tristates, New York.

Cyrtina pyramidalis (Hall).

Spirifer pyramidalis Hall, Pal. New York, 2, 1852, p. 266, pl. 54, fig. 7.

Cyrtina pyramidalis Miller, N. A. Geol. Pal., 1889, p. 343.—Grabau, Bull. New York State Mus., 45, 1901, p. 197, fig. 115; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 197, fig. 115.

Clinton (Rochester): Lewiston, New York.

CYRTOCERAS Goldfuss.

Genotype: *C. depressum* Goldfuss.

Cyrtoceras Goldfuss, in De la Beche's Handbuch der Geognosie, 1832, p. 536.—Portlock, Rep. Geol. Londonderry, 1843, p. 411.—McCoy, Syn. Char. Carb. Foss. Ireland, 1844, p. 11.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 1.—Woodward, Man. Mollusca, pt. 1, 1851, p. 91.—Saemann, Paleontographica, 3, 1852, pp. 156, 161.—McCoy, Brit. Pal. Rocks Foss., 1854, p. 312.—Pictet, Traité de Pal., 2d ed., 2, 1854, p. 652.—Barrande, Bull. Soc. Geol. France, 2d ser., 12, 1855, p. 158.—Emmons, Amer. Geology, 1, pt. 3, 1855, p. 147.—Billings, Canadian Nat. Geol., 2, 1857, p. 136, pl. 2, fig. 3.—Chapman, Canadian Jour., n. s., 2, 1857, p. 266; 8, 1863, p. 22.—Salter, Geol. Surv. Canada, dec. 1, 1858, p. 31.—Barrande, Syst. Sil. Centre Boheme, 2, pt. 1, 1867, p. 375.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 131.—Hall, Pal. New York, 5, pt. 2, 1879, pp. 354, 368, 389.—Blake, Mon. Brit. Foss. Cephalopoda, 1882, p. 54.—Zittel, Handb. d. Pal., 2, 1884, p. 373.—Foord, Cat. Foss. Ceph. Brit. Mus.,

CYRTOCERAS—Continued.

vol. 1, 1888, p. 262.—Miller, N. A. Geol. Pal., 1889, p. 432.—Whidborne, Mon. Dev. Fauna South England, 1, Pal. Soc., 1890, p. 102.—Koken, Die Leitfossilien, Leipzig, 1896, p. 49, fig. 33.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 803.—Grabau, Bull. New York State Mus., 45, 1901, p. 216; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 216.—Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 530.—Foord, Mon. Carb. Ceph. Ireland, pt. 5, Pal. Soc., App., 1903, p. 212.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 94.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1026.—Hyatt, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 611.

Glyptodendron Claypole, Amer. Jour. Sci. Arts, 15, 1878, p. 302. (Genotype: *G. eatonense* Claypole).—Foerste, Amer. Geol., 12, 1893, pp. 134-139.

Glyptoceras Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 537. (Genotype: *G. eatonense* Claypole.).

CYRTOCERAS? *ABRUPTUM* Hall. See *Orthoceras abruptum*.

Cyrtoceras? *acinacellum* Whitfield.

Cyrtoceras acinacellum Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 327, pl. 27, figs. 10-13.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 508.

Canadian (Beekmantown): Fort Cassin, Vermont.

Cyrtoceras *alethes* Billings.

Cyrtoceras Alethes Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 193, text fig. 177a-c.

Ozarkian? (Levis—erratic): Point Levis, Quebec.

Cyrtoceras *amœnum* Miller.

Cyrtoceras amœnum Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 105, pl. 3, fig. 8.—James, J. F., ibid., 8, 1886, p. 247.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1027, pl. 49, fig. 1.

Richmond (Whitewater): Richmond, Indiana.

CYRTOCERAS (*PHRAGMO CERAS*) *AMPLICORNE* Hall. See *Halloceras hercules*.

CYRTOCERAS *ANNULATUM* Hall. See *Spyroceras subannulatum*.

CYRTOCERAS *ARCTICAMERATUM* Hall. See *Mælonoceras arcticameratum*.

CYRTOCERAS *ARCUATUM* Hall. See *Cyrtoceras subarcuatum*.

Cyrtoceras *aristides* Billings.

Cyrtoceras aristides Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 316.

Canadian (Beekmantown): Phillipsburg, Quebec.

Cyrtoceras *baffinense* Schuchert.

Cyrtoceras baffinensis Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 171, pl. 14, figs. 11-13.

Mohawkian: Head of Frobisher Bay, Baffin Land.

Holotype.—Cat. No. 28198, U.S.N.M.

Cyrtoceras *beekmanense* Whitfield.

Cyrtoceras beekmanensis Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 57, pl. 10, figs. 2, 3.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 506.

Canadian (Beekmantown): Beekmantown, New York.

CYRTOCERAS *BILLINGSI* Salter. See *Zitteloceras billingsi* and *Z. hallianum*.

CYRTOCERAS BONDI Safford. See *Plectoceras bondi*.

Cyrtoceras bovinum Clarke and Ruedemann.

Cyrtoceras bovinum Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 90, pl. 16, figs. 8, 9; pl. 18, figs. 5, 6.

Niagaran (Guelph): Rochester, New York.

CYRTOCERAS BOYCH Whitfield. See *Cyrtactinoceras boycii*.

CYRTOCERAS BREVICORNE Hall. See *Cyclostomiceras brevicorne*.

Cyrtoceras camurum Hall.

Cyrtoceras camurum Hall, Pal. New York, 1, 1847, p. 196, pl. 42, fig. 6.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 148.—Whitfield, Geol. Wisconsin, 4, 1882, p. 231, pl. 7, figs. 7, 8, 9.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 805, pl. 60, figs. 5, 6.

Mohawkian: Middleville, New York (Trenton): Beloit, Wisconsin (Black River).

CYRTOCERAS? CANCELLATUM Hall. See *Cyrtoceras subcancellatum*.

Cyrtoceras capricornulus (Troost).

Not recognized.

Conilites capricornulus Troost, 5th Geol. Rep. Tennessee, 1840, p. 50.

Cyrtoceras capricornulus Troost, 6th Geol. Rep. Tennessee, 1841, p. 178.

Ordovician(?): Davidson County, Tennessee.

Cyrtoceras carrollense Worthen.

Cyrtoceras Carrollensis Worthen, Geol. Surv. Illinois, 6, 1875, p. 496, pl. 23, fig. 3.

Trenton (Galena): Carroll County, Illinois.

Cyrtoceras cinctutum Foerste.

Cyrtoceras cinctutus Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 61, pl. 3, figs. 37a-b.

Niagaran (Osgood): Clifton, Tennessee.

Cyrtoceras clintonense Foerste.

Cyrtoceras Clintonense Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 534, pl. 36, figs. 2a-e.

Upper Medinan (Brassfield): Huffmans quarry, near Dayton, Ohio.

Cyrtoceras clitus Billings.

Cyrtoceras clitus Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 85, fig. 24.

Niagaran (Lockport): Grimsby, Ontario.

Cyrtoceras confertissimum Whitfield.

Cyrtoceras confertissimum Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 327, pl. 27, figs. 7-9.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 506, pl. 38, figs. 1-4.

Canadian (Beekmantown): Fort Cassin, Vermont; Valcour, New York.

Cyrtoceras conicum Owen.

Not recognized.

Cyrtoceras conicum Owen, Geol. Expl. Iowa, Wisconsin, Illinois, 2d ed., 1844, p. 70, pl. 16, fig. 9.

Mohawkian: Wisconsin.

Cyrtoceras conoidale Wetherby.

Cyrtoceras conoidale Wetherby, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 78, pl. 2, figs. 6, 6a.

Maysville: Maury County, Tennessee (Leipers); Boyle and Garrard Counties, Kentucky.

Cyrtoceras constrictostriatum Hall.

Cyrtoceras constrictostriatum Hall, Pal. New York, 1, 1847, p. 195, pl. 42, figs. 2a, b, 3c, d.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 147.
Trenton: Middleville, New York.

CYRTOCERAS CONSTRICTUM Billings. See *Oncoceras constrictum*.

Cyrtoceras cordatum Parks.

Cyrtoceras cordatum Parks in Tyrrell, 22d Rep. Ontario Bur. Mines, 1913, p. 42.
Niagaran: Mouth of Nelson River, Manitoba.

CYRTOCERAS CORNICULUM Hall. See *Cyrtoceras tenuistriatum*.

Cyrtoceras cornulum Schuchert.

Cyrtoceras cornulum Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 170, pl. 14, figs. 8-10.
Mohawkian: Head of Frobisher Bay, Baffin Land.
Cotype.—Cat. No. 28121, U.S.N.M.

Cyrtoceras corydon Billings.

Cyrtoceras Corydon Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 85, fig. 23.
Niagaran (Lockport): Grimsby, Ontario.

Cyrtoceras(?) cuneatum Whiteaves.

Cyrtoceras(?) cuneatum Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 282; Ottawa Nat., 20, p. 133, figs.
Niagaran: Stonewall, Manitoba.

Cyrtoceras? dactyloides Dwight.

Cyrtoceras? dactyloides Dwight, Amer. Jour. Sci. Arts, 3d ser., 27, 1884, p. 255, pl. 7, figs. 9, 9a.
Canadian (Beekmantown): Rochdale, New York.

CYRTOCERAS DARDANUM Hall. See *Cyrtorizoceras dardanum*.

Cyrtoceras dictys Billings.

Cyrtoceras Dictys Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 192, fig. 176.
Canadian (Levis): Point Levis, Quebec.

Cyrtoceras dresbachense Sardeson.

Cyrtoceras dresbachense Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 102, pl. 6, fig. 4.
Ozarkian (Oneota): Dresbach, Minnesota.

Cyrtoceras dunleithense Miller and Gurley.

Cyrtoceras dunleithense Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 11, 1896, p. 30, pl. 3, figs. 11, 12.
Black River (Platteville): Dunleith, Illinois.

Cyrtoceras (Glyptoceras) eatonense (Claypole).

Glyptodendron eatonense Claypole, Amer. Jour. Sci. Arts (3), 15, 1878, p. 302; Geol. Mag., dec. 2, 5, 1878.—Miller, N. A. Geol. Pal., 1889, p. 119, fig. 39.
Cyrtoceras (Glyptoceras) eatonense Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 535, pl. on p. 536, figs. 1a-c, 2.
Cyrtoceras (Glyptodendron) eatonense Foerste, Amer. Geol., 12, 1893, p. 139, pl. 7, figs. 1, 2.
Upper Medinan (Brassfield): Near Eaton and near Dayton, Ohio.

Cyrtoceras eugium Hall.

Cyrtoceras eugium Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 40.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 66, pl. 9, figs. 3, 4.
Black River (Platteville): Beloit, Wisconsin.

CYRTOCERAS EXIGUUM Billings. See *Oncoceras exiguum*.

Cyrtoceras faberi J. F. James.

Cyrtoceras faberi James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 246, pl. 4, figs. 3a, b.
Richmond: Waynesville, Ohio.

CYRTOCERAS FALX Billings. See *Mælonoceras falx*.

Cyrtoceras featherstonhaughii Clarke.

Cyrtoceras featherstonhaughii Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 807, pl. 58, figs. 12–15.
Black River (Platteville): Cannon Falls, Minnesota.

Cyrtoceras filosum (Conrad).

Cyrtoceras filosum (Conrad M. S.) Emmons, Nat. Hist. New York Geol., 2, 1842, p. 392, fig. 4.—Owen, Amer. Jour. Sci. Arts, 47, 1844, p. 369, fig. 4 on p. 365.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 2.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 181, fig.

Cyrtolites filosum Hall, Pal. New York, 1, 1847, p. 190, pl. 41, figs. 3a, b.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 167, pl. 12, fig. 4; *Man. Geol.*, 1860, p. 98, fig. 87.

Trenton: Watertown, New York.

CYRTOCERAS POSTERI Hall. See *Cyrtorizoceras fosteri*.

CYRTOCERAS FRAGILE Billings. See *Oncoceras fragile*.

CYRTOCERAS FULTONENSIS Meek and Worthen. See *Cyrtorizoceras dardanum*.

CYRTOCERAS GIGANTEUM McChesney. See *Nautilus?? cancellatus*.

Cyrtoceras gracile Cleland.

Cyrtoceras sp. Cleland, Amer. Pal., 3, Bull. 13, 1900, p. 19, pl. 17, figs. 5, 6.
Cyrtoceras gracilis Cleland, Bull. Amer. Pal., 4, 1903, p. 13, pl. 3, fig. 11.
Canadian (Tribes Hill): Fort Hunter, Tribes Hill, and Canajoharie, New York.

CYRTOCERAS HALLEANUS D'Orbigny. See *Zitelloceras hallianum*.

CYRTOCERAS HERCULES Hall. See *Protophragmoceras hercules*.

CYRTOCERAS HERTZERI Hall and Whitfield. See *Hexameroceras hertzeri*.

Cyrtoceras hitzi Foerste.

Cyrtoceras hitzi Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 78, pl. 1, fig. 7a, b; pl. 2, figs. 23a–c.
Richmond (Whitewater-Saluda): Madison, Indiana.

Cyrtoceras houghtoni Clarke.

Cyrtoceras houghtoni Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 807, pl. 59, figs. 12–15.
Black River (Platteville): Cannon Falls, Minnesota.

Cyrtoceras howardi Miller.

Cyrtoceras howardi Miller, 18th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1894, p. 323, pl. 12, fig. 1; adv. sheets, 1892, p. 69, pl. 12, fig. 1.
Niagaran (Laurel): St. Paul, Indiana.

CYRTOCERAS HURONENSE Billings. See *Oncoceras huronense*.

Cyrtoceras indianense Miller.

Cyrtoceras indianensis Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1892, p. 698, pl. 18, fig. 1, 2; adv. sheets, 1891, p. 88.

Niagaran (Laurel): St. Paul and Hartsville, Indiana.

Cyrtoceras infundibulum Whitfield.

Cyrtoceras infundibulum Whitfield, Ann. Rep. for 1879, Geol. Surv. Wisconsin, 1880, p. 66; Geol. Wisconsin, 4, 1882, p. 300, pl. 20, figs. 4, 5.

Niagaran (Racine): Racine, Wisconsin.

Cyrtoceras irregulare Wetherby.

Cyrtoceras irregulare Wetherby, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 79, pl. 2, fig. 3.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 246.

Richmond (Waynesville): Oregonia (Freeport) and Waynesville, Ohio; Versailles, Indiana.

CYRTOCERAS ISODORUS Billings. See *Cyrtorizoceras isodorus*.

Cyrtoceras juvenalis Billings.

Cyrtoceras juvenalis Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 177; App., p. 420, fig. 400a, b.

Trenton: Montreal, Quebec.

CYRTOCERAS KIRBYI Whitfield. See *Ooceras kirbyi*.

CYRTOCERAS LAMELLOSUM Hall. See *Zitteloceras hallianum*.

Cyrtoceras laterale Hall.

Cyrtoceras laterale Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 357, pl. 18 (9), figs. 4-6; rev. ed., 1870, p. 407, pl. 18, figs. 4-6, pl. 24, fig. 5.

Niagaran (Racine and Guelph): Racine, Wisconsin.

Cyrtoceras laticurvatum Whiteaves.

Cyrtoceras laticurvatum Whiteaves, Canadian Rec. Sci., 6, 1895, p. 395.; Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 224, fig. 14.

Black River or Richmond: Lake Winnipeg, Canada.

Cyrtoceras ligarius Billings.

Cyrtoceras Ligarius Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 176.

Richmond: Drummond Island, Lake Huron.

Cyrtoceras loculosum Hall.

Cyrtoceras loculosum Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 42.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 67, pl. 9, figs. 6-9.

Ozarkian (Oneota): Madison, Wisconsin.

Cyrtoceras lucillum Hall.

Cyrtoceras lucillum Hall, 20th Rep. New York State Cab. Nat. Hist. (extras, 1865), 1868, p. 349, pl. 18 (9), fig. 7; rev. ed., 1870, p. 406, pl. 18, fig. 7.

Niagaran (Racine): Wauwatosa, Wisconsin.

Cyrtoceras luthel Calvin.

Cyrtoceras luthel Calvin, Amer. Geol., 10, 1892, p. 147; Bull. Lab. Nat. Hist. State Univ. Iowa, 2, 1892, p. 193.

Ozarkian (Oneota): Northeastern Iowa.

Cyrtoceras lysander Billings.

Cyrtoceras Lysander Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 161, fig. 146a-d (adv. sheets, 1862).

Richmond: Cape Smyth, Manitoulin Island, Lake Huron.

Cyrtoceras macrostomum Hall.

Cyrtoceras marginalis Conrad (not Phillips, 1841), Proc. Acad. Nat. Sci. Philadelphia, 1, 1843, p. 334.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 147, fig. 30.

Cyrtoceras macrostomum Hall, Pal. New York, 1, 1847, p. 194, pl. 42, figs. 1a-c, 3a-b.—Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 584.

Black River: Mineral Point, Wisconsin (Platteville); Middleville, New York; Carlisle, Pennsylvania.

Cyrtoceras magister Miller.

Cyrtoceras obscura Miller (not Barrande), Cincinnati Quart. Jour. Sci., 2, 1875, p. 132, text fig. 17.

Cyrtoceras magister Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 284.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 246.—Miller, N. A. Geol. Pal., 1889, p. 434, fig. 729.

Eden (Southgate): Cincinnati, Ohio.

Cyrtoceras manitobense Whiteaves.

Cyrtoceras Manitobense Whiteaves, Trans. Royal Soc. Canada, 7, sec. 4, 1890, p. 80, pl. 13, figs. 3-5; pl. 15, fig. 4; Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 223.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 170.

Oncoceras manitobense Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 799.

Black River or Richmond: Lake Winnipeg, Manitoba; Baffin Land.

CYRTOCERAS MARGINALIS Conrad. See *Cyrtoceras macrostomum*.

Cyrtoceras markoei Castelnau.

Not recognized.

Cyrtoceras Markoei Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 30, pl. 9, fig. 3.

Ordovician: Montmorency River, Canada.

Cyrtoceras massiense Safford.

Cyrtoceras Massiense Safford, Geol. Tennessee, 1869, p. 290, pl. 4 (G 3), fig. 4a, b. Trenton: Nashville, Tennessee.

Cyrtoceras mccoylei Billings.

Cyrtoceras McCoyi Billings, Canadian Nat. Geol., 4, 1859, p. 467.

Chazy: Mingan Islands, Quebec.

CYRTOCERAS METELLUS Billings. See *Mælonoceras metellus*.

Cyrtoceras microscopicum Dwight.

Cyrtoceras microscopicum Dwight, Amer. Jour. Sci. Arts (3), 27, 1884, p. 256, pl. 7, fig. 11.

Canadian (Beekmantown): Rochdale, New York.

CYRTOCERAS MINNEAPOLIS Clarke. See *Cyrtorizoceras minneapolis*.

Cyrtoceras missisquoi Billings.

Orthoceras Missisquoi Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 314, fig. 303.

Cyrtoceras missisquoi Miller, N. A. Geol. Pal., 1889, p. 435 (gen. ref.).

Canadian (Beekmantown): Phillipsburg, Quebec.

Cyrtoceras multicameratum Hall.

Cyrtoceras multicameratum Hall, Pal. New York, 1, 1847, p. 195, pl. 42, fig. 4.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 147.

Trenton: Middleville, New York.

CYRTOCERAS MYRICE Hall and Whitfield. See *Kionoceras darwini*.

Cyrtoceras nashvillense Miller.

Cyrtoceras nashvillensis Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, p. 697, pl. 16, fig. 1; adv. sheets, 1891, p. 87.

Niagaran (Osgood or Laurel): West of Nashville, Tennessee.

CYRTOCERAS NELEUS Hall. See *Mælonoceras neleus*.

Cyrtoceras norwoodi Clarke.

Cyrtoceras norwoodi Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 809, pl. 60, figs. 7-9.

Black River (Platteville): Rockton, Illinois.

CYRTOCERAS OBSCURA Miller. See *Cyrtoceras magister*.

CYRTOCERAS ORCAS Hall. See *Oncoceras orcas*.

Cyrtoceras orestes Billings.

Cyrtoceras Orestes Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 177.
Upper Medinan (Cataract): West Flamborough, Ontario.

CYRTOCERAS ORODES Billings. See *Cyclostomiceras orodes*.

CYRTOCERAS PLANODORSATUM Whitfield. See *Tripteroceras planodorsatum*.

Cyrtoceras postumius Billings.

Cyrtoceras Postumius Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 178.
Richmond: Cape Smyth, Manitoulin Island, Lake Huron.

Cyrtoceras pusillum Hall.

Cyrtoceras pusillum Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 357;
rev. ed., 1870, p. 407.

Niagaran (Racine): Racine, Wisconsin.

Cyrtoceras quebecense Whiteaves.

Cyrtoceras Quebecense Whiteaves, Ottawa Nat., 12, 1898, p. 120; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 315, pl. 35, figs. 1, 1a.

Canadian (Levis limestone): Point Levis, Quebec.

CYRTOCERAS RAEI Whitfield. See *Ooceras? raei*.

Cyrtoceras rectum Whitfield.

Cyrtoceras rectum Whitfield, Ann. Rep. for 1877, 1878, p. 85; Geol. Wisconsin, 4, 1882, p. 319, pl. 24, figs. 6, 8.

Niagaran (Guelph): Carlton, Wisconsin.

Cyrtoceras regulare Billings.

Cyrtoceras regulare Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 314.

Black River (Leray): Pauquettes Rapids, Ottawa River, Canada.

Cyrtoceras reversum Spencer.

Not recognized.

Cyrtoceras reversum Spencer, Bull. Missouri State Mus., 8, 1884, p. 60, pl. 7, fig. 8; Trans. Acad. Sci. St. Louis, 4, 1884, p. 610, pl. 7, fig. 8.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 96.

Niagaran (Lockport): Limehouse Station, Ontario.

Observation.—Cast of the living chamber probably of *Poterioceras sauridens* Clarke and Ruedemann, figured in a reversed position.

Cyrtoceras rigidum Hall.

Cyrtoceras rigidum Hall, 20th Rep. New York State Cab. Nat. Hist., 1863, p. 353, fig., pl. 16 (7), figs. 3-5; rev. ed., 1870, p. 408, pl. 16, figs. 3-5, text fig. 5.
Niagaran (Racine): Bridgeport, Illinois.

Cyrtoceras saffordi Miller.

Cyrtoceras saffordi Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 698, pl. 17, figs. 2, 3; adv. sheets, 1891, p. 88.
Trenton (Catheys): Nashville, Tennessee.

Cyrtoceras scofieldi Clarke.

Cyrtoceras scofieldi Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 810, pl. 49, figs. 9-11.
Black River (Platteville): Janesville, Wisconsin.

CYRTOCERAS SEPTORIS Hall and Whitfield. See *Septameroceras septore*.

Cyrtoceras shumardi Clarke.

Cyrtoceras shumardi Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 810, pl. 60, figs. 1-4.
Black River (Platteville): Cannon Falls, Minnesota.

Cyrtoceras simplex Billings.

Cyrtoceras simplex Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 313.
Black River: "Lot N. concession A. Nepean," Canada.

Cyrtoceras sinuatum Billings.

Cyrtoceras sinuatum Billings, Geol. Surv. Rep. Progr. for 1853-56, 1857, p. 315.—
Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 312, pl. 40, figs. 3, 3a.
Black River (Leray): La Petite Chaudière, Ottawa River, Canada.

Cyrtoceras? stonense Safford.

Cyrtoceras? stonense Safford, Geol. Tennessee, 1869, p. 290, pl. 4 (G. 3), figs. 2a-c.
Stones River (Murfreesboro): Murfreesboro, Tennessee.

CYRTOCERAS SUBANNULATUS D'Orbigny. See *Spyroceras subannulatum*.

Cyrtoceras subarcuatum D'Orbigny.

Cyrtoceras arcuatum Hall (not Steininger, 1830), Pal. New York, 1, 1847, p. 196, pl. 42, figs. 5a-c.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 147.
Cyrtoceras subarcuatum D'Orbigny, Prodr. de Pal., 1, 1849, p. 2.
Trenton: Middleville, New York.

Cyrtoceras subcancellatum Hall.

Cyrtoceras? cancellatum Hall (preoccupied), Pal. New York, 2, 1852, p. 290, pl. 61, figs. 2a-c.
Cyrtoceras subcancellatum Hall, Miller's N. A. Geol. Pal., 1st ed., 1877, p. 243.—
Grabau, Bull. New York State Mus., 45, 1901, p. 216, fig. 148; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 216, fig. 148.
Clinton (Rochester): Niagara Falls, etc., New York.

Cyrtoceras (Glyptoceras) subcompressum Beecher.

Cyrtoceras subcompressum Beecher, 5th Rep. State Geol. New York for 1885, 1886, pl. 14, figs. 2, 3; Pal. New York, 7, Sup., 1888, p. 35, pl. 129, figs. 2, 3.—
Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 276, pl. 7, fig. 7.

Cyrtoceras (Glyptoceras) subcompressum—Continued.

Cyrtoceras (Glyptoceras) subcompressum Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 535, pl. 32, figs. 7a-d; fig. 3 of pl. on p. 536.

Cyrtoceras (Glyptodendron) subcompressum Foerste, Amer. Geol., 12, 1893, p. 139, pl. 7, fig. 3.

Upper Medinan (Brassfield): Near New Carlisle and near Springfield, Ohio.

Cyrtoceras subrectum Hall.

Cyrtoceras subrectum Hall, Pal. New York, 3, 1859, 1861, p. 342, pl. 69, figs. 3a-3d.

Cayugan (Manlius): Herkimer County, New York.

Cyrtoceras subturbinatum Billings.

Cyrtoceras subturbinatum Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 312.

Chazyan (Mingan): Mingan Island, Quebec.

Cyrtoceras surgens Barrande.

Cyrtoceras surgens Barrande, Syst. Sil. Centre Boheme, 2, pt. 3, 1870, p. 728, pl. 431, figs. 16, 17.

Canadian (Levis): Point Levis, Quebec.

CYRTOCERAS SYPHAX Billings. See *Eremoceras syphax*.**Cyrtoceras tenuiseptum** Faber.

Cyrtoceras tenuiseptum Faber, Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 18, pl. 1, figs. 3a, b, c.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1028, pl. 49, figs. 2, 2a.

Richmond (Waynesville): Near Waynesville, Ohio; Versailles, Indiana.

Cyrtoceras tenuistriatum Hall.

Cyrtoceras corniculum Hall (preoccupied), Rep. Geol. Surv. Wisconsin, 1862, p. 41, figs. 1, 2.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 809, pl. 59, fig. 16.

Cyrtoceras tenuistriatum Hall, in Miller's Amer. Pal. Foss., 1877, p. 243.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, pl. 9, fig. 12.

Black River: Mineral Point, Wisconsin (Platteville): Warsaw, Minnesota (Decorah).

Cyrtoceras thompsoni Miller.

Cyrtoceras thompsoni Miller, 18th Ann. Rep. Indiana, Dep. Geol., Nat. Res., 1894, p. 323, pl. 10, figs. 7, 8 (adv. sheets 1892).—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1029, pl. 49, figs. 3, 3a.

Richmond: Longwood, Fayette County, Indiana.

Cyrtoceras trentonense (Emmons).

Orthoceratites trentonensis Emmons, Nat. Hist. New York, Geol., 2, 1842, p. 396, fig. 2.

Cyrtoceras Trentonensis D'Orbigny, Prodr. de Pal., 1, 1849, p. 2 (gen. ref.).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 181, fig.

Oncoceras trentonense Lesley, Ibid., p. 494, fig.

Trenton: New York.

Cyrtoceras vollandighami Miller.

Cyrtoceras Vollandighami Miller, Cincinnati Quart., Jour. Sci., 1, 1874, p. 232, fig. 23.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 245.—

Miller, N. A. Geol. Pal., 1889, p. 435, fig. 730.

Maysville: Cincinnati, Ohio, and vicinity (Fairmount); Nashville and Columbia, Tennessee (Leipers).

***Cyrtoceras vassarina* Dwight.**

Cyrtoceras Vassarina Dwight, Amer. Jour. Sci. Arts, 3d ser., 27, 1884, p. 254, pl. 7, figs. 7, 7a, 8.

Canadian (Beekmantown): Rochdale, New York.

***Cyrtoceras ventricosum* Miller.**

Cyrtoceras ventricosa Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 131, fig. 16.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 246.—Miller, N. A. Geol. Pal., 1889, p. 435, fig. 731.

Eden (Southgate): Cincinnati, Ohio.

***Cyrtoceras whitneyi* Hall.**

Cyrtoceras whitneyi Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 39.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 65, pl. 9, fig. 5.

Richmond (Maquoketa): Maquoketa Creek, Iowa.

***Cyrtoceras(?) winonicum* Sardeson.**

Cyrtoceras(?) winonicum Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 102, pl. 6, figs. 2, 3.

Ozarkian (Oneota): Near Dresbach, Winona County, Minnesota.

CYRTOCERINA Billings.

Genotype: *C. typica* Billings.

Cyrtocerina Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 178.—Barrande, Syst. Sil. Centre Boheme, 2, pt. 1, 1867, p. 451.—Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 266.—Miller, N. A. Geol. Pal., 1889, p. 436.—Holm, Geol. Foren. Stockholm Forenhandl., 14, 1892, pp. 126, 209.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 774.—Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 517; 2d ed., 1913, p. 597.

***Cyrtocerina madisonensis* (Miller).**

Tryblidium madisonense Miller, 18th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1894, p. 318, pl. 9, fig. 38 (adv. sheets, 1892).—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 977, pl. 39, fig. 10.

Cyrtocerina madisonensis Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 32.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1910, p. 74.

Richmond (Whitewater-Saluda): Madison, Indiana.

***Cyrtocerina mercurius* Billings.**

Cyrtocerina Mercurius Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 194, text fig. 179.

Canadian (Levis): Point Levis, Quebec.

***Cyrtocerina(?) schoolcrafti* Clarke.**

Cyrtocerina(?) schoolcrafti Clarke, Geol. Minnesota, 3, pt. 2 1897 p. 774, pl. 47 figs. 12-14.

Black River (Decorah): Near Cannon Falls, Minnesota.

Holotype: Cat. No. 46526, U.S.N.M.

***Cyrtocerina typica* Billings.**

Cyrtocerina typica Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 178, text fig. 159.—Miller, N. A. Geol. Pal., 1889, p. 436, fig. 732.

Black River (Leray): Pauquette Rapids, Ottawa River, Canada.

CYTODONTA Billings.

Genotype: *C. rugosus* and *C. canadense* Billings.

Cyrtodonta Billings, Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 179; Canadian Nat. Geol., 3, 1858, p. 431; *ibid.*, 4, 1859, p. 303; *ibid.*, 6, 1861, p. 353; *ibid.*, 7, 1862, p. 392.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 310.—Zittel, Handb. Pal., 2, 1881, p. 50.—Salter, Mem. Geol. Surv. Great

CYRTODONTA—Continued.

Britain, 2d ed., 1881, p. 546.—Ulrich, Geol. Minnesota, Pal., 3, pt. 2, 1894, p. 534.—Dall, Zittel-Eastman Textb. Pal., 1, 1900, p. 365.—Koken, Die Leitfossilien, Leipzig, 1896, p. 185, fig. 151, 2.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 980.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 409.—Dall, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 442.

Palaearca Hall, Pal. New York, 3, 1859, p. 27.—Salter, Mem. Geol. Surv. Great Britain, 3, 1866, p. 341.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 310, footnote.—Salter, Cat. Camb. Sil. Foss., 1873, p. 66.

Angellum Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 105 (Genotype: *A. cuneatum* Miller).

Cypricardites Vanuxem (not Conrad), Nat. Hist. New York, Geol. 3, 1842, p. 65, footnote.—Hall, Pal. New York, 1, 1847, p. 157 footnote; 12th Rep. New York State Cab. Nat. Hist., 1859, pp. 9, 13; Pal. New York, 3, 1859, p. 270, footnote; p. 524; 15th Rep. New York State Cab. Nat. Hist., 1861, pp. 192, 193, pl. 11, fig. 4.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 309.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 134.—Miller, Cincinnati, Quart. Jour. Sci., 1, 1874, p. 147.—Nettelroth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 206.—Miller, N. A. Geol. Pal., 1889, p. 476.—Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, pp. 29–31.

Observation.—See *Bodmania* Miller for a probable synonym.

CYRTODONTA (part) Safford. See *Modiolodon* Ulrich.

CYRTODONTA ACUTUMBONA Billings. See *Vanuxemia acutumbona*.

Cyrtodonta affinis Ulrich.

Cyrtodonta affinis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 540, pl. 39, figs. 20–23.

Cypricardites affinis Miller, N. A. Geol. Pal., 2d App., 1897, p. 781 (gen. ref.).

Black River (Decorah): Six miles south of Cannon Falls, Minnesota.

Holotype.—Cat. No. 46171, U.S.N.M.

Cyrtodonta affinis fillmorensis Ulrich.

Cyrtodonta affinis var. *fillmorensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 540, pl. 39, fig. 23.

Trenton (Prosser): Near Wykoff, Fillmore County, Minnesota.

Holotype.—Cat. No. 46172, U.S.N.M.

Cyrtodonta? alata (Hall).

Posidonia? alata Hall, Geol. Rep. 4th Dist. New York, 1843, p. 72, fig. 7; Pal.

New York, 2, 1852, p. 87, pl. 27, fig. 4.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 737, fig.

Posidonomya alata Miller, N. A. Geol. Pal., 1889, p. 504 (gen. ref.).

Clinton: Rochester, New York.

Cyrtodonta ampla Ulrich.

Cyrtodonta ampla Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 538, pl. 39, fig. 34.

Cypricardites amplus Miller, N. A. Geol. Pal., 2d App., 1897, p. 781 (gen. ref.).

Black River (Platteville): Cannon Falls, Minnesota.

Holotype.—Cat. No. 46173, U.S.N.M.

Cyrtodonta? anticostiensis Billings.

Cyrtodonta? Anticostiensis Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 14.

Cypricardites anticostiensis Miller, N. A. Geol. Pal., 1889, p. 476 (gen. ref.).

Richmond (English Head and Charleton): English Head, Anticosti.

***Cyrtodonta billingsi* Ulrich.**

Cypricardites ventricosus Whitfield (not Hall), Geol. Wisconsin, 4, 1882, p. 206, pl. 5, fig. 9.

Cyrtodonta billingsi Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 538, pl. 40, figs. 2-6.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 166, pl. 11, fig. 7.—

Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 409, figs. 528d, e.

Black River: Dunleith, Illinois; Beloit, Mineral Point, etc., Wisconsin; Cannon Falls, etc., Minnesota (Platteville); Lincoln County, Missouri (Decorah); New Jersey (Jacksonburg).

Cotypes.—Cat. Nos. 46174, 46175, U.S.N.M.

***Cyrtodonta breviuscula* Billings.**

Cyrtodonta breviuscula Billings, Canadian Nat. Geol., 4, 1859, p. 446.—Whiteaves, Ottawa, Nat., 22, 1908, p. 107, pl. 3, fig. 3.

Cypricardites breviuscula Miller, N. A. Geol. Pal., 1889, p. 476 (gen. ref.).

Stones River (Pamelia): Near Ottawa, Ontario.

***Cyrtodonta canadensis* Billings.**

Cyrtodonta Canadensis Billings, Canadian Nat. Geol., 3, 1858, p. 434, figs. 8-11;

Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 182, figs. 8-10; p. 183, fig. 11; Geol. Canada, Geol. Surv. Canada, 1863, p. 148, fig. 106.—Whiteaves, Pal.

Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 241.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 167, pl. 11, fig. 3.

Cypricardites canadensis Miller, N. A. Geol. Pal., 1889, p. 476 (gen. ref.).

Black River: St. Josephs Island, La Petite Chaudiere Rapids, Fauquettes Rapids, and Lake Winnipeg, Canada; New Jersey.

CYRTODONTA CANADENSIS Grabau and Shimer. See *Megalomus canadensis*.

***Cyrtodonta cingulata* (Ulrich).**

Cypricardites cingulata Ulrich, 19th Ann. Rep. Geol. and Nat. Hist. Surv. Minnesota, 1892, p. 235, fig. 21.

Cyrtodonta cingulata Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 545, pl. 40, figs. 7, 8.

Black River (Decorah): Minneapolis, Minnesota.

Holotype.—Cat. No. 46176, U.S.N.M.

***Cyrtodonta clochensis* Foerste.**

Cyrtodonta clochensis Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 297, pl. 2, figs. 6a-b.

Black River (Lowville): La Cloche Peninsula, Ontario.

CYRTODONTA CORDIFORMIS Billings. See *Plethocardia? cordiformis*.

***Cyrtodonta cuneata* (Miller).**

Angellum cuneatum Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 106, pl. 3, fig. 11; N. A. Geol. Pal., 1889, p. 462, fig. 774.

Cyrtodonta cuneata Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1906, p. 999, pl. 45, fig. 2.

Richmond (Whitewater): Richmond, Indiana.

***Cyrtodonta descriptus* (Sardeson).**

Cypricardites descriptus Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 70, pl. 2, fig. 2.

St. Peter: Highland Park, Minnesota.

***Cyrtodonta dignus* (Sardeson).**

Cypricardites dignus Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 71, pl. 2, figs. 4, 5.

St. Peter: South St. Paul, Minnesota.

CYRTODONTA EMMA Billings. See *Rhytimya emma*.

Cyrtodonta? ferruginea (Hall and Whitfield).

Cypricardites ferrugineum Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 116, pl. 5, fig. 11.—Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 93. *Avicula whitfieldi*, Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 558, pl. 37, fig. 5. Upper Medinan (Brassfield): Near Wilmington, Ohio.
Plastotype.—Cat. No. 46544, U.S.N.M.

Cyrtodonta finitima (Sardeson).

Cypricardites finitimus Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 70, pl. 2, fig. 6.
St. Peter: Highland Park, Minnesota.

CYRTODONTA GANTII Safford. See *Modiolodon ganti*.

Cyrtodonta gibbera Ulrich.

Cyrtodonta gibbera Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 542, pl. 39, figs. 13-15.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 162, pl. 13, figs. 34, 36. Trenton: Thirteen miles south of Cannon Falls, Minnesota (Prosser); Baffin Land.
Holotype.—Cat. No. 46177, U.S.N.M.

Cyrtodonta glabella (Ulrich).

Cypricardites glabella Ulrich, 19th Ann. Rep. Geol. and Nat. Hist. Surv. Minnesota (March), 1892, p. 234, fig. 20.
Cyrtodonta glabella Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 543, pl. 39, figs. 37, 40.
Cypricardites minnesotensis Sardeson, Bull. Minnesota Acad. Nat. Sci., 3 (April), 1892, p. 338, pl. 6, fig. 21.
Black River: Minneapolis, Minnesota (Platteville and Decorah); Beloit, Wisconsin, and Dunleith, Illinois (Platteville).
Holotype and *plesiotypes*.—Cat. Nos. 46178-46180, U.S.N.M.

Cyrtodonta grandis (Ulrich).

Cypricardites grandis Ulrich, Amer. Geol., 6, 1890, p. 387, figs. 19a-c.
Cyrtodonta grandis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 547, pl. 40, fig. 11, fig. 43a-i.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 409, fig. 529. Trenton: Between Burgin and Danville, Kentucky; Cannon Falls, Kenyon, etc., Minnesota; Decorah, Iowa; Oshkosh, Wisconsin.
Cotypes and *plesiotypes*.—Cat. Nos. 46182, 46859, U.S.N.M.

Cyrtodonta grandis germana (Ulrich).

Cypricardites germanus Ulrich, 19th Ann. Rep. Geol. and Nat. Hist. Surv. Minnesota, 1892, p. 236, fig. 22.
Cyrtodonta grandis var. *germana* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 549, pl. 40, figs. 9, 10, 12, fig. 43j.
Trenton: Between Burgin and Danville, Kentucky; Cannon Falls, etc., Minnesota; Iowa; Wisconsin.
Holotype and *plesiotypes*.—Cat. Nos. 46181, 46862, U.S.N.M.

Cyrtodonta grandis intermedia Ulrich.

Cyrtodonta grandis var. *intermedia* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 549, fig. 43k.
Trenton (Catheys): Haynie's Mill, central Tennessee.
Cotype.—Cat. No. 46183, U.S.N.M.

Cyrtodonta grandis luculenta (Sardeson).

Cypicardites luculentus Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 338, pl. 6, figs. 25, 26.

Cyrtodonta grandis var. *luculenta* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 549, pl. 40, figs. 13, 14.

Richmond (Maquoketa): Granger, Bristol, etc., Minnesota.

Cyrtodonta halli (Nettelroth).

Cypicardites halli Nettelroth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 206, pl. 34, figs. 1-6.

Cyrtodonta halli Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 541 (gen. ref.).

Richmond: Oldham County, Kentucky.

Cotypes.—Cat. No. 51342, U.S.N.M.

Cyrtodonta? harrietta Billings.

Cyrtodonta harrietta Billings, Pal. Foss., Geol. Surv. Canada, 1865, p. 149, fig. 129 (adv. sheets, 1862); Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 13 (loc. ref.).

Cypicardites harrietta Miller, N. A. Geol. Pal., 1889, p. 476 (gen. ref.).

Richmond (English Head and Charleton): English Head, Anticosti.

CYRTODONTA HAYNIANA Safford. See *Vanuxemia hayniana*.

CYRTODONTA HINDI Billings. See *Whitella hindi*.

Cyrtodonta huronensis Billings.

Cyrtodonta huronensis Billings, Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 180, figs. 3, 4; Canadian Nat. Geol., 3, 1858, p. 432, figs. 3, 4; Geol. Canada, Geol. Surv. Canada, 1863, p. 147, figs. 102 a, b.—Bassler, Bull. Virginia Geol. Surv., 2a, 1909, pl. 23, figs. 1-3.

Palsearca ventricosa Hall (not Hall, 1847), Pal. New York, 3, 1859, pp. 270, 271, figs. 1-3; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 10, figs. 1-3.

Cypicardites huronensis Miller, N. A. Geol. Pal., 1889, p. 476 (gen. ref.).

Cypicardites islandicus Hall in Miller, N. A. Geol. Pal., 1st ed., 1877, p. 189.

Cyrtodonta subovata Ulrich, Geol. Minnesota, 3, 1894, p. 536, pl. 39, figs. 28, 29, 31-337, 30, 745.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 410, fig. 528a-c.

Cypicardites subovatus Miller, N. A. Geol. Pal., 2d App., 1897, p. 781 (gen. ref.).

Black River: Near Point Palladeau and St. Joseph Island, Lake Huron; Point Claire, island of Montreal, Canada; High Bridge, Kentucky; Tennessee and Virginia (Lowville); St. Paul and Cannon Falls, Minnesota (Decatur).

Plesiotypes.—Cat. Nos. 46192, 46849, etc., U.S.N.M. (*cotypes* of *C. subovata*).

CYRTODONTA HURONENSIS var. **SUBCARINATA** Chapman. See *Cyrtodonta subcarinata*.

Cyrtodonta? insularis Billings.

Cyrtodonta? insularis Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 14.

Cypicardites insularis Miller, N. A. Geol. Pal., 1889, p. 476 (gen. ref.).

Richmond (English Head): West End, Anticosti.

Cyrtodonta janesvillensis Ulrich.

Cyrtodonta janesvillensis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 537, pl. 39, figs. 26, 27.

Black River (Platteville): Janesville and Beloit, Wisconsin.

Cyrtodonta? lamellosa Hudson.

Cyrtodonta? lamellosa Hudson, Bull. New York State Mus., 80, 1905, p. 287, pl. 4, figs. 10-13.

Chazyan (Valcour): Valcour Island, Lake Champlain.

Cyrtodonta leucothea Billings.

Cyrtodonta Leucothea Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 46, fig. 49 (adv. sheets, 1862); Geol. Canada, Geol. Surv. Canada, 1863, p. 143, fig. 82.

Cypricardites leucothea Miller, N. A. Geol. Pal., 1889, p. 477 (gen. ref.).

Black River (Leray): Pauquette Rapids, Ottawa River, Canada.

Cyrtodonta normanensis Safford.

Cyrtodonta Normanensis Safford, Geol. Tennessee, 1869, p. 287 (nom. nud.).
Mohawkian: Tennessee.

Cyrtodonta obesa Ulrich.

Cyrtodonta obesa Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 542, pl. 39, figs. 10, 11, 12.

Black River: Mercer County, Kentucky; St. Paul and Preston, Minnesota (Decorah).

Cotypes.—Cat. Nos. 46184, 46185, U.S.N.M.

Cyrtodonta obliqua (Meek and Worthen).

Cypricardites obliquus Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 311, pl. 2, fig. 9a, b.

Cyrtodonta obliquus Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 540, p. 39, figs. 35, 36.

Trenton: Scales Mound, Illinois (Galena); Fillmore County, Minnesota (Prosser).

Cyrtodonta obtusa (Hall).

Ambonychia obtusa Hall, Pal. New York, 1, 1847, p. 167, pl. 36, figs. 8a-b.

Cyrtodonta obtusa Billings, Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 184, figs. 13, 14; Canadian Nat. Geol., 3, 1858, p. 436, figs. 13, 14; Geol. Canada, Geol. Surv. Canada, 1863, p. 147, fig. 101a, b.

Posidonomya obtusa Emmons, Amer. Geology, 1, pt. 2, 1855, p. 177.

Palæarca obtusa Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 65 (gen. ref.).

Cypricardites obtusus Miller, N. A. Geol. Pal., 1889, p. 477 (gen. ref.).

Trenton: Watertown, New York; Canada.

Cyrtodonta oviformis (Ulrich).

Cypricardites oviformis Ulrich, Amer. Geol., 10, 1892, p. 99, pl. 7, figs. 3, 4.

Cyrtodonta oviformis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 544, pl. 39, fig. 46; pl. 40, fig. 1.

Black River (Platteville): Janesville, Wisconsin.

Holotype.—Cat. No. 46186, U.S.N.M.

Cyrtodonta parva Ulrich.

Cyrtodonta parva Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 541, pl. 39, figs. 24, 25.
Trenton (Prosser): Near Fountain, Minnesota.

Holotype.—Cat. No. 46187, U.S.N.M.

Cyrtodonta persimilis Ulrich.

Cyrtodonta persimilis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 544, pl. 39, figs. 41, 44.

Cypricardites persimilis Miller, N. A. Geol. Pal., 1897, p. 781 (gen. ref.).

Black River (Platteville): Minneapolis, Minnesota; Beloit, Wisconsin.

Cotypes.—Cat. Nos. 46188, 46189, U.S.N.M.

CYRTODONTA? PLEBEIA Billings. See *Whitella plebeia*.

Cyrtodonta ponderosa Billings.

Cyrtodonta ponderosa Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 150 (adv. sheets, 1862).

Cypricardites ponderosa Miller, N. A. Geol. Pal., 1889, p. 477 (gen. ref.).

Richmond: Cape Smyth, Manitoulin Island, Lake Huron.

Cyrtodonta rotulata Ulrich.

Cyrtodonta rotulata Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 541, pl. 39, figs. 16-19.

Black River: Mercer County, Kentucky; Minneapolis and near Fountain, Minnesota (Decorah).

Cotypes.—Cat. Nos. 46190, 46855, U.S.N.M.

Cyrtodonta rugosa Billings.

Cyrtodonta rugosa Billings, Canadian Nat. Geol., 3, 1858, p. 432, figs. 1, 2; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 179, figs. 1, 2; Geol. Canada, Geol. Surv. Canada, 1863, p. 148, fig. 104a, b.

Cypricardites rugosus Miller, N. A. Geol. Pal., 1889, p. 477 (gen. ref.).

Black River: Near Ottawa, Ontario.

Cyrtodonta saffordi (Hall).

Palaearca saffordi Hall, Pal. New York, 3, 1859, p. 271, figs. 4, 5; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 11, figs. 4, 5,

Cyrtodonta Saffordi Safford, Geol. Tennessee, 1869, p. 287, pl. 2 (F), figs. 2a-g.

Cypricardites saffordi Hall and Whitfield, Geol. Surv. Ohio, 2, 1875, p. 177, (gen. ref.).—Leeley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 179, figs.

Trenton (Catheys): Nashville, etc., Tennessee.

Pteriotype.—Cat. No. 46191, U.S.N.M.

Cyrtodonta scala Raymond.

Cyrtodonta scala Raymond, Annals Carnegie Mus., 3, 1906, p. 578.

Chazy (Crown Point): Valcour Island, New York.

CYRTODONTA SIGMOIDEA Billings. See *Whitella? sigmoidea*.

Cyrtodonta sillimanensis Ulrich.

Cyrtodonta sillimanensis Ulrich, Proc. U. S. Nat. Mus., 22, 1900, p. 162, pl. 13, figs. 31-33.

Mohawkian: Head of Frobisher Bay, Baffin Land.

Cotypes.—Cat. No. 28159, U.S.N.M.

Cyrtodonta solitaria Raymond.

Cyrtodonta solitaria Raymond, Amer. Jour. Sci., 20, 1905, p. 373.

Chazy (Crown Point): Near Tracy Brook, Chazy, New York.

Cyrtodonta spinifera Billings.

Cyrtodonta spinifera Billings, Canadian Nat. Geol., 3, 1858, p. 435, fig. 12; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 183, fig. 12.

Cypricardites spinifera Miller, N. A. Geol. Pal., 1889, p. 477 (gen. ref.).

Black River (Leray): Pauquette Rapids, and Fourth Chute of Bonnechere, Canada.

Cyrtodonta subangulata (Hall).

Edmondia? subangulata Hall, Pal. New York, 1, 1847, p. 156, pl. 35, fig. 2a, b.

Palaearca subangulata Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 68 (gen. ref.).

Cyrtodonta subangulata—Continued.

Cyrtodonta subangulata Billings, Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 185; Canadian Nat. Geol., 3, 1858, p. 437.

Cypricardites subangulatus Miller, N. A. Geol. Pal., 1889, p. 477 (gen. ref.).

Trenton: Watertown, New York.

Cyrtodonta subcarinata Billings.

Cyrtodonta subcarinata Billings, Canadian Nat. Geol., 3, 1858, p. 433, figs. 5-7; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 181, fig. 5-7; Geol. Canada, Geol. Surv. Canada, 1863, p. 148, fig. 105.

Cypricardites subcarinata Miller, N. A. Geol. Pal., 1889, p. 477 (gen. ref.).

Cyrtodonta Huronensis var. *subcarinata* Chapman, Canadian Jour., n. s., 7, 1862, p. 117, fig. 112; Expos. Min. Geol. Canada, 1864, p. 120, fig. 112.

Black River: Pointe Claire and Valley of the Ottawa, Canada.

CYRTODONTA SUBOVATA Ulrich. See *Cyrtodonta huronensis*.

CYRTODONTA SUBTRUNCATA Billings. See *Whitella subtruncata*.

Cyrtodonta tenella (Ulrich).

Cypricardites tenellus Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv. Minn., 1892, p. 237, fig. 23.

Cyrtodonta tenella Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 546, pl. 40, fig. 15-19.

Black River (Decorah): Six miles south of Cannon Falls, Minnesota.

Cotypes.—Cat. No. 46193, U.S.N.M.

CYRTODONTA TRANCEPS Raymond. See *Endodesma tranceps*.

CYRTODONTA UNDULOSTRIATA Grabau and Shimer. See *Cypricardinia undulostriata*.

CYRTODONTA? UNGULATA Billings. See *Vanuxemia unguata*.

CYRTODONTA WINCHELLI Safford. See *Modiolodon winchelli*.

CYRTOGRAPTUS Carruthers.

Genotype: *C. murchisoni* Carruthers.

Cyrtograptus Carruthers, Rep. 37th meeting British Assoc. Adv. Sci., Notes and Abstracts, 1868, p. 57; Geol. Mag., 5, 1868, pp. 73, 127.

Cyrtograptus Lapworth, Geol. Mag., dec. 2, 3, 1876, p. 544.—Zittel, Handb. Pal., 1, 1879, p. 297.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, No. 4, 1896, p. 267.—Roemer and Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief, 1897, p. 650.—Koken, Die Leitfossilien, Leipzig, 1896, p. 328.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 459.

Cyrtograptus ulrichi Ruedemann.

Cyrtograptus ulrichi Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 459, pl. 29, fig. 4, figs. 442, 443.

Niagaran (Bainbridge): Bainbridge, Cape Girardeau County, Missouri.

Cotypes.—Cat. No. 54273, U.S.N.M.

CYRTOLITES (part) of authors. See *Oxydiscus* Koken, *Phragmolites* Conrad and *Cyrtolitina* Ulrich.

CYRTOLITES Conrad.

Genotype: *C. ornatus* Conrad.

Cyrtolites Conrad, Ann. Rep. Nat. Hist. Surv. New York, 1838, p. 118.—Hall (part), Pal. New York, 1, 1847, p. 189 footnote.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 9.—Woodward, Man. Mollusca, pt. 2, 1854, p. 201.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 166.—Hall, 15th Rep. New York State Cab. Nat. Hist., 1862, pl. 11, fig. 19.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 308.—Waagen (part), Pal. Indica (13), pt. 1, 1880, p. 132.—Lind-

CYTOLITES—Continued.

strom, Kongl. Sven. Vet.-Akad. Handl., 19, No. 6, 1881, pp. 70, 81.—Zittel, Handb. Pal., 2, 1882, p. 185.—Koken, Neues Jahrb. f. Min., Geol., Pal., 6, Belage-Band, 1889, pp. 393, 467.—Miller, N. A. Geol. Pal., 1889, p. 401.—Matthew, Trans. Royal Soc. Canada, 11, sec. 4, 1894, p. 93.—Koken, Die Leitfossilien, Leipzig, 1896, p. 100; Neues Jahrb. f. Min., Geol., Pal., 1, 1898, p. 4.; Bull. de l'Acad. Imp. Sci. St. Petersburg, 7, 1897, p. 138.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pp. 846-858.—Pilabry, Zittel-Eastman Textb. Pal., 1, 1900, p. 445.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 949.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 609.—Dall, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 522.

CYTOLITES ACUTUS Emmons. See *Sinuities cancellata acutus*.

Cyrtolites carinatus Miller.

Cyrtolites carinatus Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 311, fig. 32; N. A. Geol. Pal., 1889, p. 401, text fig. 667.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 862, pl. 62, figs. 50-52.—Grabau and Shimer, N. A. Index Fossils 1, 1909, p. 610, figs. 815 e-g.

Eden (Southgate): Cincinnati, Ohio, and vicinity.

Plesiotypes.—Cat. No. 45783, U.S.N.M.

CYTOLITES COMPRESSUS Hall. See *Phragmolites compressus*.

Cyrtolites conradi Hall.

Cyrtolites conradi Hall, Rep. Geol. Surv. Wisconsin, 1862, p. 35, fig. 6.

Richmond (Maquoketa): Southwestern Wisconsin.

CYTOLITES COSTATUS James. See *Dyeria costata*.

CYTOLITES CRISTATUS Safford. See *Oxydiscus cristatus*.

CYTOLITES DESIDERATUS Billings. See *Phragmolites desideratus*.

Cyrtolites? dilatatus Ulrich and Scofield.

Cyrtolites? *dilatatus* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 865, pl. 62, figs. 20-26.

Black River (Decorah): Goodhue County, Minnesota; Beloit, Wisconsin.

Cotype.—Cat. No. 45784, U.S.N.M.

Cyrtolites disjunctus Ulrich and Scofield.

Cyrtolites disjunctus Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 864, pl. 62, figs. 48, 49.

Richmond (Maquoketa): Near Spring Valley, Minnesota.

Holotype.—Cat. No. 45785, U.S.N.M.

CYTOLITES DYERI of authors. See *Phragmolites dyeri* and *P. elegans*.

CYTOLITES DYERI var. *CELLULOSA* Ulrich and Scofield. See *Phragmolites dyeri cellulosus*.

CYTOLITES ELEGANS Miller. See *Phragmolites elegans*.

CYTOLITES FILOSUS Hall. See *Cyrtoceras filosum*.

CYTOLITES FIMBRIATUS Miller. See *Phragmolites fimbriatus*.

CYTOLITES IMBRICATUS Meek and Worthen. See *Phragmolites imbricatus*.

CYTOLITES (MICROCERAS) INORNATUS Meek. See *Microceras inornatum*.

CYRTOLITES MAGNUS Miller. See *Oxydiscus magnus*.

CYRTOLITES NITIDULUS Ulrich. See *Cyrtolitina nitidula*.

Cyrtolites ornatus Conrad.

Cyrtolites ornatus Conrad, Ann. Geol. Rep. New York, 1838, p. 118; *ibid.*, 1839, p. 63; *ibid.*, 1841, p. 37.—Vanuxem, Nat. Hist. New York, Geol. Rep., 3, 1842, pp. 64, 65, fig. 2.—Owen, Amer. Jour. Sci. Arts, 47, 1844, p. 376, fig. 2.—Hall Pal. New York, 1, 1847, p. 308, pl. 84, figs. 1a-g.—Billings, Canadian Nat. Geol., 1, 1856, p. 43, fig. 6.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 829, fig. 619.—Chapman, Canadian Jour., new ser., 7, 1862, p. 119, fig. 119; 8, 1863, p. 206, fig. 207.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 217, fig. 226.—Chapman, Expos. Min. Geol. Canada, 1864, p. 123, fig. 119; p. 178, fig. 207.—Meek, Pal. Ohio, 1, 1873, p. 148, pl. 13, figs. 3a, b.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 308.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 5, fig. 8a.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 182, figs.—Miller, N. A. Geol. Pal., 1889, p. 402, fig. 669.—Koken, Neues Jahrb. f. Min., Geol., Pal., 6, Beilage-Band, 1889, p. 483, pl. 13, fig. 3.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 860, pl. 62, figs. 27-29.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 962, pl. 40, figs. 8, 8a.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 609, fig. 815a, b.

Porcelia ornata Sharpe, Quart. Jour. Geol. Soc. London, 4, 1847, p. 181.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 167, pl. 17, fig. 21; Man. Geology, 1860, p. 102, fig. 7 only.

Maysville and Richmond: Oswego County, etc., New York (Pulaski); Canada; Pennsylvania to Alabama; Ohio Valley; etc.

Plesiotypes.—Cat. Nos. 17898, 45786, U.S.N.M.

Cyrtolites ornatus minor Ulrich and Scofield.

Cyrtolites ornatus var. *minor* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 860, pl. 62, figs. 30-31.—Waller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 174, pl. 12, figs. 6, 7.

Trenton: Cannon Falls, Minnesota (Prosser); New Jersey.

Holotype.—Cat. No. 45787, U.S.N.M.

CYRTOLITES PANNOSUS Billings. See *Phragmolites pannosus*.

Cyrtolites parvus Ulrich.

Cyrtolites parvus Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 864, pl. 62, figs. 45-47.

Trenton (Upper): Covington, Kentucky.

Holotype.—Cat. No. 45788, U.S.N.M.

Cyrtolites retrorsus Ulrich and Scofield.

Cyrtolites retrorsus Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 861, pl. 62, figs. 32-37.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 610, fig. 815c, d.

Trenton: Near Burgin, Covington, etc., Kentucky; Nashville, etc., Tennessee.

Cotypes.—Cat. Nos. 45789, 45790, U.S.N.M.

Cyrtolites retrorsus fillmorensis Ulrich and Scofield.

Cyrtolites retrorsus var. *fillmorensis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 862, pl. 62, figs. 38, 39.

Black River (Decorah): Chatfield and near Fountain, Minnesota; Lincoln County, Missouri.

Cotypes.—Cat. No. 45791, U.S.N.M.

Cyrtolites sinuatus Hall and Whitfield.

Cyrtolites sinuatus Hall and Whitfield, U. S. Geol. Expl. 40th Parl., 4, 1877, p. 237, pl. 1, figs. 23, 24.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 127, pl. 4, fig. 9.

Ordovician: White Pine District, Nevada (Upper Pogonip); Columbia, New Jersey (Beekmantown).

Holotype.—Cat. No. 17363, U.S.N.M.

Cyrtolites sinuosus Hall.

Cyrtolites sinuosus Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 30, figs. 16–18; mus. ed., 1879, p. 178, pl. 30, figs. 16–18; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 321, pl. 31, figs. 16–18.

Niagaran (Waldron): Waldron, Indiana.

CYRTOLITES SUBACUTUS Miller. See *Oxydiscus subacutus*.

CYRTOLITES SUBCARINATUS Emmons. See *Carinaropsis carinata*.

CYRTOLITES SUBCOMPRESSUS Meek. See *Microceras inornatum*.

Cyrtolites subplanus Ulrich.

Cyrtolites subplanus Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 846, pl. 62, figs. 40–44.

Trenton (Catheys): Nashville, Tennessee.

Cotypes.—Cat. No. 45792, U.S.N.M.

CYRTOLITES TRENTONENSIS Conrad. See *Eccyliomphalus trentonensis*.

Cyrtolites youngi Foerste.

Cyrtolites Youngi Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 289, pl. 6, fig. 7; Geol. Surv. Ohio, Pal., 8, 1893, p. 549, pl. 31, figs. 7, 7a.

Upper Medinan (Brassfield): Hanover, Indiana.

CYRTOLITINA Ulrich.

Genotype: *Cyrtolites lamellifer* Lindström.

Cyrtolites Ulrich (part), Jour. Cin. Soc. Nat. Hist., 2, 1879, p. 12.—Lindström, Silurian Gastropoda of Gotland, 1884, pp. 82–84.

Cyrtolitina Ulrich, Geol. Minnesota, 3, pt. 2, 1897, pp. 847–866.—Dall, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 521.

Cyrtolitina nitidula (Ulrich).

Cyrtolites nitidulus Ulrich, Jour. Cin. Soc. Nat. Hist., 2, 1879, p. 12, pl. 7, figs. 7, 7a.

Cyrtolitina nitidula Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 866, pl. 62, figs. 53–55.

Trenton (Upper): River quarries, Covington, Kentucky.

Holotype.—Cat. No. 45793, U.S.N.M.

CYRTOMETOPUS SCOFIELDI Clarke. See *Ceraurinus scofieldi*.

CYRTORIZOCERAS Hyatt.

Genotype: *Cyrtoceras minneapolis* Clarke.

Cyrtorizoceras Hyatt, Zittel-Eastman Textb. Pal., 1900, p. 529; *ibid*, 2d ed., 1913, p. 610.

Cyrtorizoceras curvicameratum Clarke and Ruedemann.

Cyrtorizoceras curvicameratum Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 90, pl. 17, figs. 1–10.

Niagaran (Lockport-Guelph): Shelby, New York.

Cyrtorizoceras dardanum (Hall).

Cyrtoceras dardanum Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 43; 20th Rep. New York State Cab. Nat. Hist., 1868 (extras Jan., 1865), p. 349, pl. 17(8), figs. 3-5; rev. ed., 1870, p. 406, pl. 17, figs. 3-5.—Meek and Worthen, Geol. Surv. Illinois, 6, 1875, p. 506, pl. 25, figs. 6a, b.

Cyrtoceras Fultonensis Meek and Worthen, Geol. Surv. Illinois, 6, 1875, p. 506.

Cyrtorizoceras dardanus Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 91 (gen. ref.).

Niagaran: Waukesha, Wisconsin (Racine); Fulton City, Illinois.

Cyrtorizoceras fosteri (Hall).

Cyrtoceras fosteri Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 41.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 102.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868 (extras Jan., 1865), p. 349, pl. 16(7), figs. 11-13; rev. ed., 1870, p. 406, pl. 16, figs. 11-13.

Cyrtorizoceras fosteri Clarke and Ruedemann, New York State Mus., 5, 1903, p. 91 (gen. ref.).

Niagaran (Racine): Chicago, Illinois; Wisconsin.

Cyrtorizoceras isodorus (Billings).

Cyrtoceras Isodorus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 175, fig. 157a, b.

Black River: St. Joseph Island, Lake Huron.

Cyrtorizoceras minneapolis (Clarke).

Cyrtoceras minneapolis, Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 808, pl. 59, figs. 1-8.

Cyrtorizoceras minneapolis Hyatt, Zittel-Eastman Textb. Pal., 1900, p. 529 (gen. ref.).

Black River (Platteville): Minneapolis, Minnesota.

Cotype.—Cat. No. 46525, U.S.N.M.

CYTOSPIRA Ulrich.

Genotypes: *C. tortilis* Ulrich and *Subulites ventricosus* Hall.

Cyrtospira Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1073.

Cyrtospira abbreviata (Hall).

Subulites abbreviata Hall, 3d Rep. New York State Cab. Nat. Hist., rev. ed., 1850, p. 180, pl. 3, fig. 2a-c; doc. ed., p. 172.

Cyrtospira abbreviata Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1070 (gen. ref.).

Trenton: Near Watertown, New York.

Cyrtospira attenuata Ruedemann.

Cyrtospira attenuata Ruedemann, Bull. New York State Mus., 49, 1901, p. 35, pl. 2, fig. 8.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

Cyrtospira bicurvata Ulrich.

Cyrtospira bicurvata Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1074, pl. 81, figs. 21, 22.

Black River (Lowville): High Bridge, Kentucky.

Holotype.—Cat. No. 45794, U.S.N.M.

***Cyrtospira notata* (Billings).**

Subulites notatus Billings, Cat. Sil. Fossils, Anticosti, Geol. Surv. Canada, 1866, p. 54.

Cyrtospira notatus Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1070, (gen. ref.).

Anticostian (Ellis Bay): Junction Cliff, Anticosti.

***Cyrtospira parvulus* (Billings).**

Subulites parvulus Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 36 (adv. sheets, 1862).

Cyrtospira parvulus Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1070 (gen. ref.).

Black River (Leray): Pauquette Rapids, Ottawa River and near L'Original, Canada.

***Cyrtospira raymondi* (Hudson).**

Subulites raymondi Hudson, Bull. New York State Mus., 80, 1905, p. 293, pl. 4, figs. 1, 2.

Cyrtospira raymondi Raymond, Ann. Carnegie Mus., 4, 1908, p. 210, pl. 54, figs. 14, 15.

Chazyan (Crown Point, Valcour): Valcour Island and Chazy, New York.

***Cyrtospira tortilis* Ulrich.**

Cyrtospira tortilis Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1074, pl. 81, figs. 24, 25.

Subulites tortilis Miller, N. A. Geol. Pal., 2d App., 1897, p. 770 (gen. ref.).

Stones River (Murfreesboro): Murfreesboro, Tennessee.

Holotype.—Cat. No. 46053, U.S.N.M.

***Cyrtospira ventricosa* (Hall).**

Subulites ventricosa Hall, Pal. New York, 2, 1852, p. 347, pl. 83, fig. 7a, b.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 339, fig. 346.—Hall, 20th Rep. New York State Cab. Hist., 1868, p. 346, pl. 15 (6), fig. 1; rev. ed. (1870), p. 398, pl. 15, fig. 1; p. 433.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 71, pl. 3, fig. 5; Quart. Jour. Geol. Soc. London, 31, 1875, p. 549, pl. 26, fig. 5.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 19, No. 6, 1881, p. 193, pl. 15, figs. 19–21; pl. 18, fig. 58, 59.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 193, fig.—Lealey, Geol. Surv. Pennsylvania Rep. P 4, 1890, p. 1144, fig.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 96.

Cyrtospira ventricosa Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1073 (gen. ref.).—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 338.

Niagaran (Guelph): Gault, etc., Ontario; Wisconsin.

***Cyrtospira wykoffensis* Ulrich and Scofield.**

Cyrtospira wykoffensis Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1074, pl. 81, fig. 23.

Subulites wykoffensis Miller, N. A. Geol. Pal., 2d App., 1897, p. 770 (gen. ref.). Trenton (Prosser): Wykoff, Minnesota.

Holotype.—Cat. No. 45795, U.S.N.M.

CYRTOTHECA CORRUGATA Matthew. See *Styliola corrugata*.

CYRTOTHECA MINUTA Matthew. See *Styliola minuta*.

CYSTASTER Hall. See *Hemicystites* Hall.

CYSTIPHOROLITES Miller.Genotype: *Vesicularia major* Rominger.*Vesicularia* Rominger (not Thompson), Geol. Surv. Michigan, 3, pt. 2, 1876, p. 135.*Cystiphorolites* Miller, N. A. Geol. Pal., 1889, p. 183.—Sherzer, Amer. Geol., 7, 1891, pp. 296–301.***Cystiphorolites major*** (Rominger).*Vesicularia major* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 135, pl. 49, upper tier.*Cystiphorolites major* Miller, N. A. Geol. Pal., 1889, p. 183 (gen. ref.).

Niagaran: Point Detour; Drummonds Island, Michigan.

Cystiphorolites minor (Rominger).*Vesicularia minor* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 136, pl. 49, upper tier.*Cystiphorolites minor* Miller, N. A. Geol. Pal., 1889, p. 183 (gen. ref.).

Niagaran: Masonville, Iowa.

Cystiphorolites variolosus (Rominger).*Vesicularia variolosa* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 136, pl. 49, fig. 4.*Cystiphorolites variolosa* Miller, N. A. Geol. Pal., 1889, p. 183 (gen. ref.).

Niagaran: Point Detour, Michigan.

CYSTIPHYLLUM Lonsdale.Genotype: *C. siluriensæ* Lonsdale.

Cystiphyllum Lonsdale in Murchison's Sil. Syst., 1839, p. 691.—Dana, Wilkes' U. S. Expl. Exped., 1838–1842, 7, Zoophytes, 1846, p. 360; Amer. Jour. Sci. Arts (2), 1, 1846, p. 186.—Edwards and Haime, Mon. d. Polyp. Foss. d. Terr., Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), pp. 175, 462.—McCoy, British Pal. Rocks Foss., 1854, p. 32.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 462.—Billings, Geol. Surv. Canada, Rep. Progr. for 1857, p. 178; Canadian Nat. Geol., 3, 1858, p. 430; Canadian Jour., n. s., 4, 1859, p. 136.—Milne-Edwards, Hist. Nat. Corall., 3, 1860, p. 447.—Lindstrom, Geol. Mag., 3, 1866, p. 359.—Dybowski, Archiv. f. Naturf., Liv-, Ebst- und Kurl., 5, 1873, pp. 340, 522.—Nicholson, Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 35.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 137.—Zittel, Handb. Pal., 1, Munich, 1879, p. 234.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 399.—Frech, Pal. Abh., Dames and Kayser, bd. 3, Heft 3, 1886, p. 108.—Miller, N. A. Geol. Pal., 1889, p. 183.—Frech, Palaeontographica, 37, 1890, p. 43.—Sherzer, Amer. Geol., 7, 1891, pp. 277, 296–301.—Koken, Die Leitfossilien, Leipzig, 1896, p. 312.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 126.—Zittel-Eastman Textb. Pal., 1, 1900, p. 79.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 190.—Pocta, Syst. Sil. Centre Bohème, 8, pt. 2, 1902, p. 160.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 87.

Conophyllum Hall, Pal. New York, 2, 1852, p. 114; Amer. Jour. Sci. and Arts, 2d ser., 11, 1851, p. 399 (Genotype: *C. niagarense* Hall).***Cystiphyllum americanum anderdonense*** Grabau.*Cystiphyllum americanum* mut. *anderdonense* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 104, pl. 12, figs. 3–5.

Upper Monroan: Detroit River region (Amherstburg); Amherstburg, Ontario (Anderdon).

Cystiphyllum gemmula Greene.*Cystiphyllum gemmula* Greene, Cont. Indiana Pal., pt. 2, 1899, p. 12, pl. 6, figs. 8, 9.

Niagaran (Louisville): Louisville, Kentucky.

Cystiphyllum granilineatum Hall.

Cystiphyllum granilineatum Hall, 12th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 274, pl. 15, fig. 13; pl. 23, fig. 13; 35th Rep. New York State Mus. Nat. Hist., p. 418 (ext., 1882, p. 14).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, p. 184, figs.

Niagaran (Louisville): Louisville, Kentucky.

CYSTIPHYLLUM HURONENSE Billings. See *Cystiphyllum niagarense*.

Cystiphyllum incurvum Davis.

Cystiphyllum incurvum Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 124, figs. 6-8.

Niagaran (Louisville): Louisville, Kentucky.

Cystiphyllum lineatum Davis.

Cystiphyllum lineatum Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 128, figs. 1-4.

Niagaran (Louisville): Louisville, Kentucky.

Cystiphyllum louisvillense Greene.

Cystiphyllum louisvillense Greene, Cont. Indiana Pal., 1, pt. 6, 1901, p. 45, pl. 16 figs. 7-10.

Niagaran (Louisville): Louisville, Kentucky.

Cystiphyllum maritimum Billings.

Cystiphyllum maritima Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, pp. 112 (adv. sheets, 1862).—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 191, pl. 18, figs. 2, 2a.

Silurian: L'Anse a la Vieille, Bay of Chaleurs, Quebec.

Cystiphyllum niagarense (Hall).

Chonophyllum niagarense Hall, Pal. New York, 2, 1852, p. 114, pl. 32, fig. 4a-n.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 190, fig.—Miller, N. A. Geol. Pal., 1889, p. 177, fig. 150.—Sherzer, Bull. Geol. Soc. Amer., 3, 1892, p. 266.—Grabau, Bull. New York State Mus., 45, 1901, p. 139, fig. 32.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 62, fig. 92.

Cystiphyllum Niagarense Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 138, pl. 49, fig. 3.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 124, figs. 1-5.—Lambe, Ottawa Nat., 12, 1899, p. 224; Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 190, pl. 16, fig. 7.

Cystiphyllum Huronense Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 92.

Niagaran: Lockport, etc., New York (Lockport); Louisville, Kentucky (Louisville); Drummond Island, etc., Lake Huron; Wisconsin; Anticosti.

Cystiphyllum spinulosum Foerste.

Cystiphyllum spinulosum Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 321, pl. 5, figs. 1a-k.

Clinton (Waco): Near Estill Springs, Waco and Panola, Kentucky.

CYSTOCRINUS Roemer.

Genotype: *C. tennesseensis* Roemer.

Cystocrinus Roemer, Silur. Fauna West Tennessee, 1860, p. 56.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 404 (Rev. Pal., pt. 2, p. 230).—Miller, N. A. Geol. Pal., 1889, p. 237.

Cystocrinus tennesseensis Roemer.

Cystocrinus tennesseensis Roemer, Sil. Fauna West Tennessee, Breslau, 1860, p. 56, pl. 4, figs. 8a-d.—Miller, N. A. Geol. Pal., 1889, p. 237, fig. 279.—Bather, Geol. Mag., dec. 4, 5, 1898, p. 327, fig. 2.—Foerste, Jour. Geol., 11, 1903, p. 712.

Niagaran (Brownsport): Decatur and Perry Counties, Tennessee.

CYSTOSTYLUS Whitfield.

Genotype: *C. typicus* Whitfield.

Cystostylus Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1879, 1880, p. 63; Geol. Wisconsin, 4, 1882, p. 273.—Miller, N. A. Geol. Pal., 1889, p. 184.—Sherzer, Amer. Geol., 8, 1891, pp. 296-301.

Cystostylus infundibulus (Whitfield).

Syringopora infundibula Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1877, 1878, p. 79.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 53.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 35, pl. 1, figs. 6-9.

Cystostylus infundibulus Whitfield, Geol. Wisconsin, 4, 1882, p. 274, pl. 14, fig. 7.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 188, fig.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 2 (loc. occ.); *ibid.*, pt. 2, 1895, p. 49 (loc. occ.).

Niagaran: Milwaukee and Wauwatosa, Wisconsin (Racine); Durham, Ontario, and Shelby, New York (Guelph).

Cystostylus typicus Whitfield.

Cystostylus typicus Whitfield, Ann. Rep. for 1879, Wisconsin Geol. Surv., 1880, p. 64; Geol. Wisconsin, 4, 1882, p. 274, pl. 14, figs. 8, 9.

Niagaran (Racine-Waukesha): Cato and Sturgeon Bay, Wisconsin.

CYTHERE BALTICA Roemer. See *Leperditia hisingeri*.**CYTHERE CINCINNATIENSIS** Meek. See *Elpe cincinnatiensis*.**CYTHERE IRREGULARIS** Miller. See *Elpe irregularis*.**CYTHERE SUBLÆVIS** Shumard. See *Leperditia sublævis*.**CYTHERELLA** Jones.

Genotype: *C. ovata* (Roemer).

Cytherella Jones, Mon. Entom. Cret. Form., 1848, p. 28.—Bosquet, Desc. Entom. Foss. Terr. Tert., 1852, p. 10.—Bonnemann, Zeits. d. d. geol. Gesell., 7, 1855, p. 353.—Richter, Zeits. d. d. geol. Gesell., 19, 1867, p. 226.—Jones, Kirkby, and Brady, Mon. Brit. Foss. Biv. Entom. Carb. Form., Pal. Soc., 1874, p. 6; *ibid.*, 1884, p. 57, 70.—Zittel, Handb. Pal., 1885, p. 556.—Jones and Kirkby, Proc. Geol. Assoc. London, 9, 1886, p. 502.—Jones, Ann. Mag. Nat. Hist., 5th ser., 19, 1887, p. 192.—Vogdes, Annals New York Acad. Sci., 5, 1889, p. 4, pl. 2, fig. 4.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 707.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 684.—Koken, Die Leitfossilien, Leipzig, 1896, p. 40.—Zittel-Eastman Textb. Pal., 1, 1900, p. 646.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 366.—Bassler, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 740.

Cytherella? rugosa (Jones).

Cytheropsis rugosa Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 249, pl. 10, fig. 5; Geol. Surv. Canada, dec. 3, 1858, p. 100.

Primitia rugosa Jones and Holl, Ann. Mag. Nat. Hist., 4th ser., 2, 1868, p. 55, footnote (gen. ref.).

Cytherella? rugosa—Continued.

Cytherella? rugosa Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 89 (gen. ref.).—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 686, pl. 43, figs. 21-24.—

Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 366, fig. 1666, t, u.

Black River (Leray): Pauquette Rapids, Ottawa River, Canada.

Trenton (Prosser): Near Cannon Falls, Minnesota.

Plesiotypes.—Cat. No. 41814, U.S.N.M.

Cytherella? rugosa arcta Ulrich.

Cytherella? rugosa var. *arcta* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 686, pl. 43, fig. 25.

Trenton (Prosser): Near Cannon Falls, Minnesota.

Holotype.—Cat. No. 41815, U.S.N.M.

Cytherella? subrotunda Ulrich.

Cytherella? subrotunda Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 685, pl. 44, fig. 43.

Black River (Decorah): Minneapolis, Minnesota.

CYTHERINA ALTA Conrad. See *Leperditia alta* and *L. jonesi*.

CYTHERINA BALTHICA Hisinger (part). See *Leperditia hisingeri*.

CYTHERINA CRENULATA Emmons. See *Cytheropsis crenulata*.

CYTHERINA CYLINDRICA Hall. See *Leperditia cylindrica*.

CYTHERINA EMMONSI Vogdes. See *Cytheropsis emmonsi*.

CYTHERINA FABULITES Conrad. See *Leperditia fabulites*.

CYTHERINA PHASEOLUS Hisinger. See *Leperditia phaseolus*.

CYTHERINA SPINOSA Hall. See *Æchmina spinosa*.

CYTHERINA SUBCYLINDRICA Emmons. See *Cytheropsis emmonsi*.

CYTHERINA SUBELLIPTICA Emmons. See *Cytheropsis subelliptica*.

CYTHERODON Hall.

Genotype: *C. nasutus* Hall.

Cytherodon Hall, 23d Rep. New York State Cab. Nat. Hist., 1873, pl. 14, figs. 19-21; Pal. New York, 5, pt. 1, Lam. 2, 1885, p. 53.—Miller, N. A. Geol. Pal., 1889, p. 477.

Cytherodon? placidus Billings.

Cytherodon? placidus Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 137, pl. 8, fig. 10 (var. pl. 8, fig. 11).

Silurian: Arisaig, Nova Scotia.

Cytherodon? socialis Billings.

Cytherodon? socialis Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 138, pl. 8, fig. 12.

Silurian: Arisaig, Nova Scotia.

CYTHEROPSIS McCoy.

Genotype: *C. aldensis* McCoy.

Cytheropsis McCoy, Ann. Mag. Nat. Hist., 2d ser., 4, 1849, p. 414; Cont. British Pal., 1854, p. 153; Synopsis British. Pal. Rocks., 1855, pl. 1 L, fig. 2.—Jones, Ann. Mag. Nat. Hist. (3), 1, 1858, p. 248; Geol. Surv. Canada, dec. 3, 1858, p. 98.—Barrande, Syst. Sil. du Centre Boheme, 1, Suppl., 1872, p. 506.—Miller, N. A. Geol. Pal., 1889, p. 541.

CYTHEROPSIS CINCINNATIENSIS Miller. See *Elpe cincinnatiensis*.

CYTHEROPSIS CONCINNA Jones. See *Aparchites concinnus* and *Primitia muta*.

Cytheropsis crenulata (Emmons).

Cytherina crenulata Emmons, Amer. Geology, 1, pt. 2, 1855, p. 220, figs. 75d, c.—

Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 187, figs.

Cytheropsis crenulata Miller, N. A. Geol. Pal., 1889, p. 541 (gen. ref.).

Trenton: Middleville, New York.

Cytheropsis emmonsi (Vogdes).

Cytherina subcylindrica Emmons (preoccupied), Amer. Geology, 1, pt. 2, 1855, p. 220, fig. 75b.

Cytheropsis subcylindrica Miller, N. A. Geol. Pal., 1889, p. 542 (gen. ref.).

Cytherina emmonsi Vogdes, Annals New York Acad. Sci., 5, 1889, p. 13k.

Trenton: Middleville, New York.

CYTHEROPSIS IRREGULARIS Miller. See *Elpe irregularis*.

CYTHEROPSIS RUGOSA Jones. See *Cytherella? rugosa*.

CYTHEROPSIS SILIQUA Jones. See *Macrocypris? siliqua*.

CYTHEROPSIS SUBCYLINDRICA Emmons. See *Cytheropsis emmonsi*.

Cytheropsis subelliptica (Emmons).

Cytherina subelliptica Emmons, Amer. Geology, 1, 1855, p. 220, fig. 75a.

Cytheropsis subelliptica Miller, N. A. Geol. Pal., 1889, p. 542 (gen. ref.).

Trenton: Near Watertown, New York.

CYTOCRINUS Roemer. See *Melocrinus* Goldfuss.

DACTYLOPHYCUS Miller and Dyer.

Genotype: *D. tridigitatum* Miller and Dyer.

Dactylophycus Miller and Dyer, Cont. to Pal., 2, 1878, p. 1.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 164.—Miller, N. A. Geol. Pal., 1889, p. 116.

Dactylophycus quadripartitum Miller and Dyer.

Dactylophycus quadripartitum Miller and Dyer, Cont. to Pal., 2, 1878, p. 2, pl. 3, fig. 1.

Eden (Economy): Cincinnati, Ohio, and vicinity.

Dactylophycus tridigitatum Miller and Dyer.

Dactylophycus tridigitatum Miller and Dyer, Cont. to Pal., 2, 1878, p. 2, pl. 3, fig. 2.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 164.—Miller, N. A. Geol. Pal., 1889, p. 116, fig. 29.

Eden (Economy): Cincinnati, Ohio, and vicinity.

DÆDALUS Rouault.

Genotype: *D. newtoni* Rouault.

Dædalus Rouault, Bull. Soc. Geol. France, 2d ser., 7, 1850, p. 736.—Sarle, Proc. Rochester Acad. Sci., 4, 1906, p. 203.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 247.

Vexillum Rouault, Bull. Soc. Geol. France, 2d ser., 7, 1850, p. 733 (Genotype: *V. labechei* Rouault).

Dædalus archimedes (Ringueberg).

Arthrophycus sp. Hall, Pal. New York, 2, 1852, p. 6, pl. 2, fig. 2.

Spirophyton archimedes Ringueberg, Proc. Acad. Nat. Sci. Philadelphia, 1884, p. 144, pl. 2, fig. 1.

Taonurus archimedes Miller, N. A. Geol. Pal., 1889, p. 146 (gen. ref.).

Dædalus archimedes—Continued.

Dædalus archimedes Sarle, Proc. Rochester Acad. Sci., 4, 1906, p. 203.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 248.

Upper Medinan: Lockport, etc., New York; Pennsylvania; Maryland; Virginia; Tennessee.

DALMANELLA Hall and Clarke.

Genotype: *Orthis testudinaria* Dalman.

Orthis (group of *O. testudinaria*) Hall, Bull. Geol. Soc. Amer., 1, 1889, p. 21.

Dalmanella Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 205, 223.—Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 439.—Hall and Clarke, 11th Ann. Rep. New York State Geol., 1894, p. 170.—Wysogorski, Zeits. d. d. geol. Gesell., 52, 1900, p. 225.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 187; Bull. New York State Mus., 45, 1901, p. 187.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 259.—Cumings, 32d Ann. Rep., Dep. Geol. Nat. Res. Indiana, 1908, p. 888.

DALMANELLA AMENA Schuchert. See *Pianodema amena*.

Dalmanella arcuaria Hall and Clarke.

Dalmanella arcuaria Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 224, 341, pl. 5C, figs. 20, 21.—Foerste, Jour. Geol., 11, 1900, p. 711 (loc. occ.).

Orthis (*Dalmanella*) *arcuaria* Hall and Clarke, 48th Rep. New York State Mus. for 1895, 2, 1897, p. 340, pl. 4, figs. 13, 14; 14th Rep. State Geol. New York for 1894, 1897, p. 340, pl. 4, figs. 13, 14.

Niagaran (Brownsport): Perry County, Tennessee.

Dalmanella bassleri Foerste.

Dalmanella bassleri Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 215.

Trenton (Upper): Carnestown, etc., Kentucky; Florence, Indiana.

DALMANELLA BELLULA Hall and Clarke. See *Pianodema bellula*.

DALMANELLA BREVICULUS Foerste. See *Dalmanella emacerata brevicula*.

Dalmanella centrilineata (Hall).

Orthis centrilineata Hall, Pal. New York, 1, 1847, p. 289, pl. 79, fig. 5.

Dalmanella centrilineata Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 260. Cincinnati (Pulaski): Lorraine and Turin, New York.

Dalmanella clarki Maynard.

Dalmanella clarki Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 300, pl. 54, figs. 7-10.

Helderbergian (Keyser): Cash Valley, Maryland.

Dalmanella concinna (Hall).

Orthis concinna Hall, Pal. New York, 3, 1859, p. 172, pl. 10a, figs. 1-3.

Dalmanella concinna Hall and Clarke, Pal. New York, 8, 1892, pt. 1, pp. 207, 224.—Maynard, Maryland Geol. Surv., Low Dev., 1913, p. 301, pl. 54, figs. 11-13.

Helderbergian (Keyser): Cumberland, etc., Maryland; Keyser, West Virginia; Pleasant Valley and Hyndman, Pennsylvania.

Dalmanella corpulenta (Sardeson).

Orthis corpulenta Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 330, pl. 5, figs. 8-10; Amer. Geol., 19, 1897, p. 101, pl. 4, figs. 11-19.

Orthis (*Dalmanella*) *testudinaria* var. *meeki* Winchell and Schuchert (not Miller), Geol. Minnesota, 3, 1893, p. 445, pl. 23, figs. 25-29.

Richmond (Maquoketa): Granger and Spring Valley, Minnesota.

DALMANELLA CRISPATA Hall and Clarke. See *Hebertella* (*Glyptorthia*) *crispata*.

***Dalmanella edgewoodensis* Savage.**

Dalmanella edgewoodensis Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 76, pl. 4, figs. 11-13, pl. 7, fig. 9.

Upper Medinan: Near Thebes, Illinois; Missouri (Edgewood); Will County, Illinois (Channahon).

***Dalmanella electra* (Billings).**

Orthis Electra Billings, Pal. Fossils, 1, 1865, p. 79, fig. 72; p. 217; Geol. Canada, 1863, p. 231, fig. 246.—White, Wheeler's Rep. Geol. Geogr. Expl. west 100 Merid., 4, 1875, p. 55.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 513, figs.

Dalmanella electra Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 223.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 125, pl. 4, fig. 13.

Canadian: Point Levis, Quebec; Point Rich, etc., Newfoundland; St. John, New Brunswick; House Range, Utah; Columbia, New Jersey.

***Dalmanella electra lævis* (Matthew).**

Orthis electra var. *lævis* Matthew, Trans. Royal Soc. Canada, 10, 1893, p. 100.

Dalmanella electra lævis Schuchert, Bull. U. S. Geol. Surv., 87, 1899, p. 200.

Canadian (Bretonian—Div. C 3d): St. John, New Brunswick.

***Dalmanella electra major* (Matthew).**

Orthis electra var. *major* Matthew, Trans. Royal Soc. Canada, 10, 1893, p. 100, pl. 7, fig. 3.

Dalmanella electra major Schuchert, Bull. U. S. Geol. Surv., 87, 1899, p. 200.

Canadian (Bretonian—Div. C 3d): St. John, New Brunswick.

***Dalmanella elegantula* (Dalman).**

Orthis elegantula Dalman, Kongl. Svenska Vet.-Akad. Handl., 1828, p. 117, pl. 2, fig. 6.—Hall, Pal. New York, 2, 1852, p. 252, pl. 52, fig. 3.—Billings, Canadian Nat. Geol., 1, 1856, p. 136, pl. 2, fig. 5.—Roemer, Sil. Fauna West Tennessee, 1860, p. 62, pl. 5, fig. 7.—Billings, Geol. Canada, 1863, p. 312, fig. 320.—Chapman, Canadian Jour., n. s., 8, 1863, p. 212, fig. 218; Expos. Min. Geol. Canada, 1864, p. 184, fig. 218.—Davidson, Mon. British Sil. Brach., Pal. Soc., 1869, p. 205, figs. 1, 2; p. 211, pl. 27, figs. 1-9.—Hall, 28th Rep. New York State Mus. Nat. Hist., 1879, p. 150, pl. 21, figs. 11-17; 11th Rep. State Geol. Indiana, 1882, p. 285, pl. 21, figs. 11-17; 2d Ann. Rep. State Geol., 1883, pl. 35, figs. 34-37; 36th Rep. New York State Mus. Nat. Hist., 1884, p. 75, pl. 3, figs. 8, 9.—Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 84, pl. 13, fig. 1.—Miller, N. A. Geol. Pal., 1889, p. 357, fig. 590.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 514, figs.—Nettelroth, Kentucky Foss. Shells, Mem. Kentucky Geol. Surv., 1889, p. 37, pl. 32, figs. 52-57.—Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 14, pl. 1, figs. 3-12.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 307.

Orthis canalis Hall, Geol. New York, Rep. 4th Dist., 1843, p. 105, fig. 6.—Owen, Amer. Jour. Sci. Arts, 48, 1845, p. 313, fig. 6.—Emmons, Man. Geol., 1860, p. 109, fig. 99.

Orthis elegantula? var. Hall, Pal. New York, 2, 1852, p. 57, pl. 20, fig. 7.

Dalmanella elegantula Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 207, 224; pl. 5C, figs. 15-19.—Grabau, Bull. New York State Mus., 45, 1901, p. 187, fig. 97; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 187, fig. 97.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 41, pl. 4, fig. 9.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 433, pl. 2, fig. 9.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 261, fig. 312.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 27.

***Dalmanella elegantula*—Continued.**

Orthis (*Dalmanella*) *elegantula* Foerste, Geol. Ohio, 7, 1895, p. 581, pl. 25, figs. 11, 17.

Silurian: Europe. Widely distributed in all of the post-Richmond Silurian formations of eastern North America.

Plesiotypes.—Cat. No. 51345, U.S.N.M. (Nettelroth.)

***Dalmanella elegantula media* (Shaler).**

Orthis media Shaler, Bull. Mus. Comp. Zool., 1, 1865, p. 65.—Billings, Cat. Sil. Fossils of Anticosti, 1866, p. 41.

Rhipidomella media Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 349.

Anticostian (Jupiter River and Chicotte): Southwest Point, etc., Anticosti.

***Dalmanella elegantula parva* (Foerste).**

Orthis elegantula var. *parva* Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 85, pl. 13, fig. 17.

Dalmanella elegantula var. *parva* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 224.

Upper Medinan (Brassfield): Dayton, Ohio.

DALMANELLA EMACERATA Foerste (1909). See *Dalmanella fultonensis*.

***Dalmanella emacerata* (Hall).**

Orthis emacerata Hall, 13th Rep. New York State Cab. Nat. Hist., 1860, p. 121; 15th Rep. *ibid.*, 1862, pl. 2, figs. 1, 3.—Billings, Canadian Nat. Geol., 7, 1862, p. 393.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 24.—Hall, 2d Ann. Rep. New York State Geol., 1883, pl. 34, figs. 14, 15.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 515, figs.—Keyes, Geol. Surv. Missouri, 5, 1895, p. 58.—Sardeson, Amer. Geol., 19, 1897, p. 102, pl. 5, figs. 14, 18, 28.

Orthis cycilus James, Cincinnati Quart. Jour. Sci., 1, 1874, p. 19.

Dalmanella emacerata Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 207, 224, pl. 5C, figs. 1, 2.—Grabau and Shimer, N. A. Index Foss., 1, 1907, p. 260, fig. 311i-m.—Foerste, Sci. Lab. Denison Univ., Bull. 17, 1912, p. 128, pl. 8, figs. 3a, b.

Dalmanella testudinaria var. *emacerata* Cumings, 32d Ann. Rep., Dep. Geol. Nat. Res., Indiana, 1908, p. 898, pl. 33, figs. 5-5a.

Dalmanella emacerata filosa Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 214, pl. 4, fig. 1.

Eden (Fulton-Southgate): Cincinnati, Ohio, and vicinity.

***Dalmanella emacerata brevicula* (Foerste).**

Dalmanella breviculus Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, pp. 216, 322, pl. 7, fig. 5.

Orthis emacerata (part) Hall, 15th Rep. New York State Cab. Nat. Hist., 1862, pl. 2, fig. 2.

Dalmanella emacerata brevicula Foerste, Bull. Sci. Lab. Denison Univ., 17, 1912, p. 128.

Eden (Southgate): Cincinnati, Ohio; Vevay, Indiana.

DALMANELLA EMACERATA FILOSA Foerste. See *Dalmanella emacerata*.

***Dalmanella* (?) *evadne* (Billings).**

Orthis evadne Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 81, fig. 74; p. 79 (adv. sheets 1862).—Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 300, pl. 24, fig. 8.—Seely, Vermont State Geol., Rep., 7, 1910, pl. 62, fig. 8.

Dalmanella? *evadne* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 223, pl. 5B, figs. 25, 26.

Canadian: Point Levis, Quebec (Levis); Fort Cassin, Vermont (Beekmantown).

Dalmanella fairmountensis Foerste.

Dalmanella fairmountensis Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 216, pl. 4, figs. 2a-c; p. 322, pl. 7, fig. 2.

Maysville (Bellevue): Hamilton and Cincinnati, Ohio; New Trenton, etc., Indiana.

Dalmanella fertilis Bassler.

Orthis (*Dalmanella*) *testudinaria* Hayes and Ulrich, U. S. Geol. Surv., folio 95, Illust. Sheet, 1903, figs. 42, 43.

Orthis (*Dalmanella*) *fertilis* Bassler, Bull. Virginia Geol. Surv., 2, 1909, pl. 24; fig. 5.

Trenton (Hermitage): Central Tennessee, Kentucky, and Virginia.

Cotypes and *plesiotypes*.—Cat. No. 35455, U.S.N.M.

DALMANELLA FISSIPLICA Foerste. See *Orthostrophia* (*Schizorammina*) *fissiplica*.

Dalmanella freitana (Clarke).

Orthis (*Dalmanella*) *freitana* Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Engl. ed., 1900, p. 10, pl. 1, figs. 22-24.

Silurian: Rio Trombetas, Brazil.

Dalmanella fultonensis Foerste.

Dalmanella emacerata Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 321, pl. 7, fig. 1.

Dalmanella fultonensis Foerste, Bull. Sci. Lab. Denison Univ., 17, 1912, p. 129. Eden (Fulton): Cincinnati, Ohio.

Dalmanella futilis (Sardeson).

Orthis futilis Sardeson, Amer. Geol., 19, 1897, p. 104, pl. 5, figs. 25-27.

Dalmanella testudinaria futilis Schuchert, Bull. U. S. Geol. Surv., 87, p. 205.

Richmond (Maquoketa): Near Granger and Wykoff, Minnesota.

DALMANELLA GIBBOSA Hall and Clarke. See *Pianodema subaequata gibbosa*.

Dalmanella hamburgensis (Walcott).

Orthis hamburgensis Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 73, pl. 2, fig. 5.

Orthis (*Dalmanella*) *hamburgensis*? Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 440, pl. 33, figs. 14-16.

Upper Pogonip: Eureka District, Nevada.

Black River: St. Paul, etc., Minnesota (Decorah); High Bridge, Kentucky (Lowville).

Cotypes.—Cat. No. 17259, U.S.N.M.

Dalmanella holiensis Cleland.

Dalmanella holiensis Cleland, Bull. Amer. Pal., 3, 1900, p. 130 (258), pl. 17, fig. 9.

Canadian (Tribes Hill): Near Fort Hunter, New York.

Dalmanella ignota (Sardeson).

Orthis ignota Sardeson, Amer. Geol., 19, 1897, pp. 99, 181, pl. 5, figs. 1-7.

Dalmanella testudinaria ignota Schuchert, Bull. U. S. Geol. Surv., 87, 1907, p. 205.

Richmond (Maquoketa): Near Spring Valley, Minnesota.

DALMANELLA JUGOSA Foerste. See *Dalmanella meeki*.

Dalmanella lunata (Sowerby).

Orthis lunata Sowerby, Sil. Syst., 1839, p. 611, pl. 5, fig. 15.—Davidson, British Sil. Brach., 1869, p. 215, pl. 28, figs. 1-5.

Dalmanella lunata—Continued.

Dalmanella lunata Williams, Proc. U. S. Nat. Mus., 45, 1913, p. 337, pl. 30, figs. 1-5, 8.

Orthis orbicularis Sowerby, Sil. Syst., 1839, p. 611, pl. 5, fig. 16.

Silurian: England; Leighton Cove, Washington County, Maine (Pembroke).

Plesiotypes.—Cat. Nos. 58957-58959, U.S.N.M.

Dalmanella macleodi (Whitfield).

Orthis macleodi Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 43, pl. 7, figs. 1-4.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 523, figs.

Dalmanella macleodi Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 224.

Canadian (Beekmantown): Beekmantown, New York.

Dalmanella macrior (Sardeson).

Orthis macrior Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 330, pl. 5, figs. 5-7.

Orthis (*Dalmanella*) *testudinaria* var. *emacerata* Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 445, pl. 33, figs. 23-24.

Orthis emacerata Sardeson, Amer. Geol., 19, 1897, p. 102, pl. 5, figs. 14-18, 28.

Richmond (Maquoketa): Spring Valley and Granger, Minnesota.

Dalmanella meeki (Miller).

Orthis emacerata Meek (not Hall), Pal. Ohio, 1, 1873, p. 109, pl. 8, figs. 1, 2.

Orthis parva Billings (not Verneuil), Cat. Sil. Foss. Anticosti, 1866, p. 41.

Orthis meeki Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 20.—Sardeson, Amer. Geol., 19, 1897, p. 98, pl. 4, figs. 24-29.

Dalmanella meeki Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 206, 224, pl. 5C, fig. 3.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 218 (synonymy and history discussed).

Dalmanella testudinaria var. *meeki* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 899, pl. 33, figs. 6-6g.

Orthis jugosa James, Paleontologist, 4, 1879, p. 31.

Dalmanella jugosa Foerste, Bull. Sci. Lab. Denison Univ., 4, 1909, pl. 14, figs. 16a-b, p. 218; Ohio Nat., 12, No. 3, 1912, p. 453, pl. 22, fig. 1.

Richmond: Oxford, etc., Ohio; Indiana; Kentucky; Anticosti; etc.

Dalmanella melita (Hall and Whitfield).

Leptena melita Hall and Whitfield, King's U. S. Geol. Surv., 40th Parl., 4, 1877, p. 208, pl. 1, figs. 13, 14.—Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 22.

Dalmanella melita Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 202.

Lower Pogonip: Eureka District, Nevada.

Dalmanella modesta Savage.

Dalmanella modesta Savage, Bull. Geol. Surv., Illinois, 23, 1913, p. 48, pl. 1, figs. 14, 15.

Upper Medinan (Girardeau): Alexander County, Illinois.

Dalmanella multisecta (Meek).

Orthis multisecta James, Cat. L. Sil. Foss. Cincinnati Group, 1871, p. 10 (nom. nud.).—Sardeson, Amer. Geol., 19, 1897, p. 97, pl. 4, figs. 20-23.

Orthis emacerata var. *multisecta* Meek, Pal. Ohio, 1, 1873, p. 112, pl. 8, fig. 3.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 22.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 515, figs.

Dalmanella testudinaria var. *multisecta* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 901, pl. 33, figs. 4, 4c.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 205.

Dalmanella multisecta—Continued.

Dalmanella multisecta Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 207–224.—Cumings, Amer. Geol., 28, 1901, p. 374.—Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 217.—Bassler, Bull. Virginia Geol. Surv., 2a, 1909, pl. 14, figs. 4–6.

Eden: Cincinnati, Ohio, and vicinity; Maryland; Virginia; East Tennessee; Albany County, New York (Indian Ladder).

DALMANELLA PERVETA Hall and Clarke. See *Pianodema subæquata* and *P. subæquata perveta*.

DALMANELLA? *FLICIFERA* Schuchert. See *Leptaena incrassata*.

Dalmanella porrecta (Sardeson).

Orthis porrecta Sardeson, Amer. Geol., 19, 1897, p. 104, pl. 5, figs. 19–24.

Dalmanella testudinaria porrecta Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 205.

Richmond (Maquoketa): Near Granger, Minnesota.

Dalmanella postelegantula Weller.

Dalmanella postelegantula Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 232, pl. 20, figs. 21–24.

Helderbergian (Decker Ferry): Two miles south of Tristates, New York.

Dalmanella rogata (Sardeson).

Orthis rogata Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 331, pl. 5, figs. 1–4; Amer. Geol., 19, 1897, p. 95, pl. 4, figs. 1–10.

Orthis (*Dalmanella*) *testudinaria* Hall, Pal. New York, 8, pt. 1, 1892, pl. 5B, figs. 27 to 31.—Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 441, pl. 33, figs. 17–22.

Black River and Trenton: St. Paul, etc., Minnesota; Iowa and Wisconsin.

Dalmanella? *ruida* (Billings).

Orthis ruida Billings, Cat. Sil. Fossils of Anticosti, 1866, p. 42.

Gamachian (Ellis Bay): Gamache Bay, Anticosti.

Dalmanella smithi (Clarke).

Orthis (*Dalmanella*) *smithi* Clarke, Archivos Mus. Nac. Rio de Janeiro, 10, author's Eng. ed., 1900, p. 11, pl. 1, figs. 12–16.

Silurian: Rio Trombetas, Brazil.

DALMANELLA STONENSIS Hall and Clarke. See *Pianodema stonensis*.

DALMANELLA SUBÆQUATA Hall and Clarke. See *Pianodema subæquata*.

DALMANELLA SUBÆQUATA var. *PERVETUS* Ruedemann. See *Pianodema subæquata perveta*.

Dalmanella tersa (Sardeson).

Orthis tersus Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 331, pl. 5, figs. 11–13; Amer. Geol., 19, 1897, p. 100, pl. 5, figs. 8–13.

Dalmanella tersa Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 204.

Richmond (Fernvale): Wilmington, Illinois; Tennessee.

Dalmanella testudinaria (Dalman).

Orthis testudinaria Dalman, Kongl. Svenska Vet.-Akad. Handl., 1828, p. 115, pl. 2, fig. 4.—Conrad, Ann. Rep. Geol. Surv. New York, 1839, p. 63.—Emmons,

Geol. New York, Rep. 2d Dist., 1842, p. 404, fig. 4.—Hall, Pal. New York, 1, 1847, p. 117, pl. 32, fig. 1; p. 288, pl. 79, fig. 4.—Emmons, Amer. Geol., 1,

Dalmanella testudinaria—Continued.

- pt. 2, 1855, p. 194, pl. 9, figs. 1a-i; pl. 17, fig. 12.—Billings, *Canadian Nat. and Geol.*, 1, 1856, p. 40, fig. 1.—Rogers, *Geol. Pennsylvania*, 2, pt. 2, 1858, p. 818, fig. 601.—Emmons, *Man. Geol.*, 1860, p. 102, fig. 3; p. 99, fig. 88.—Hitchcock, *Geol. Vermont*, 1, 1862, p. 294, fig. 201.—Chapman, *Canadian Jour.*, n. s., 7, 1862, p. 111, fig. 90; *ibid.*, 8, 1863, p. 199, fig. 182.—Billings, *Geol. Canada*, 1863, p. 165, fig. 144.—Chapman, *Expos. Min. Geol. Canada*, 1864, p. 114, fig. 90; p. 171, fig. 182.—Safford, *Geol. Tennessee*, 1869, p. 275, fig. 8.—Miller, *Cincinnati Quart. Jour. Sci.*, 1875, p. 20.—White, *Wheeler's Expl. Surv. west 100th Merid.*, 4, 1875, p. 72.—Shaler, *Mem. Geol. Surv. Kentucky*, 1, 1876, p. 31.—Whitfield, *Geol. Wisconsin*, 4, 1882, p. 258, pl. 12, figs. 5-7.—Hall, *2d Ann. Rep. New York State Geol.*, 1883, pl. 34, figs. 1-4, 6-13.—Chamberlin, *Geol. Wisconsin*, 1, 1883, p. 155, fig.—Walcott, *Mon. U. S. Geol. Surv.*, 8, 1884, p. 72, pl. 11, fig. 10.—Lealey, *Geol. Surv. Pennsylvania*, *Rep. P* 4, 1889, p. 536, figs.; p. 537, figs.—Sardeson, *Amer. Geol.*, 19, 1897, pp. 92, 96.
- Orthis striatula* Emmons, *Geol. New York*, *Rep. 2d Dist.*, 1842, p. 394, fig. 3.—Owen, *Amer. Jour. Sci. Arts*, 47, 1844, p. 366, fig. 3.
- Orthis disparilis* Owen (not Conrad), *Geol. Surv. Wisconsin*, *Iowa*, *Minnesota*, 1852, pl. 2B, fig. 23.
- Dalmanella testudinaria* Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, pp. 190, 206, 218, 224, pl. 5B, figs. 31-39.—Ruedemann, *Bull. New York State Mus.*, 49, 1902, p. 25.—Weller, *Geol. Surv. New Jersey*, *Pal.*, 3, 1903, p. 155, pl. 10, figs. 1, 2; p. 216, pl. 16, figs. 4, 5.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 260, fig. 311a-e.
- Orthis (Dalmanella) testudinaria* Whiteaves, *Pal. Foss. Geol. Surv. Canada*, 3, pt. 2, 1895, p. 121; *ibid.*, 3, pt. 3, 1897, pp. 177, 241.—Schuchert, *Proc. U. S. Nat. Mus.*, 22, 1900, p. 156.
- Middle and Upper Ordovician: Europe and America.
- Observation.—The above miscellaneous citations refer to a variety of forms.

DALMANELLA TESTUDINARIA var. **EMACERATA** Cumings. See *Dalmanella emacerata*.

DALMANELLA TESTUDINARIA **FUTILIS** Schuchert. See *Dalmanella futilis*.

DALMANELLA TESTUDINARIA **IGNOTA** Schuchert. See *Dalmanella ignota*.

DALMANELLA TESTUDINARIA var. **MEEKI** Cumings. See *Dalmanella meeki*.

DALMANELLA TESTUDINARIA var. **MULTISECTA** Schuchert. See *Dalmanella multisecta*.

DALMANELLA TESTUDINARIA **PORRECTA** Schuchert. See *Dalmanella porrecta*.

Dalmanella wemplei Cleland.

Dalmanella (Orthis) wemplei Cleland, *Bull. Amer. Pal.*, 3, 1900, p. 129 (257), pl. 17, figs. 10-13.

Dalmanella wemplei Weller, *Geol. Surv. New Jersey*, *Pal.*, 3, 1903, p. 124, pl. 4, figs. 10-12.—Cleland, *Bull. Amer. Pal.*, 4, 1903, p. 19.

Canadian (Tribes Hill): Tribes Hill, Fort Hunter, etc., New York; New Jersey.

DALMANIA Salter. See *Dalmanites* Barrande.

DALMANIA **BICORNIS** Hall. See *Dalmanites bicornis*.

DALMANIA **BREVICEPS** Hall. See *Chasmops breviceps*.

DALMANIA **CALLICEPHALA** Hall. See *Pterygometopus callicephalus*.

DALMANIA CAUDATA Roemer. See *Dalmanites limulurus*.

DALMANIA DANAE Meek and Worthen. See *Dalmanites danae*.

DALMANIA LIMULURUS Lincklaen. See *Dalmanites limulurus*.

DALMANIA LOGANI Hall. See *Dalmanites logani* Hall.

DALMANIA META Hall. See *Pterygometopus meta*.

DALMANIA VERRUCOSA Hall. See *Dalmanites verrucosus*.

DALMANIA VIGILANS Hall. See *Dalmanites vigilans* and *D. halli*.

DALMANITES Barrande.

Genotype: *Trilobus caudatus* Bronn.

Dalmania Emmrich, *Zur. Naturg. d. Tril.*, 1844, p. 15; *Neues Jahrb. f. Min.*, etc., 1845, p. 40.—Salter, *Mem. Geol. Surv. Great Britain*, 2, pt. 1, 1848, p. 336.—Barrande, *Neues Jahrb. f. Min.*, etc., 1850, p. 779; *Syst. Sil. du Centre Boheme*, 1, 1852, p. 528.—Pictet, *Traite de Pal.*, 2d ed., 2, 1854, p. 501.—Meek and Worthen, *Proc. Acad. Nat. Sci. Philadelphia*, 1865, p. 256.—Schmidt, *Mem. l'Acad. Imp. Sci. St. Petersburg*, 7, ser. 30, 1881, p. 61.

Dalmanites Barrande, *Syst. Sil. du Centre, Boheme*, 1, 1852, p. 934.—Chapman, *Canadian Jour.*, n. s., 8, 1863, p. 30; *Expos. Min. Geol. Canada*, 1864, p. 138.—Meek and Worthen, *Geol. Surv. Illinois*, 3, 1868, p. 367.—Miller, *Cincinnati Quart. Jour. Sci.*, 1, 1874, p. 142.—Hall, 28th Rep. *New York State Mus. Nat. Hist.*, mus. ed., 1879, p. 191.—Packard, *Amer. Nat.*, 14, 1880, p. 504.—Hall, 11th Ann. Rep. *Indiana Dep. Geol. Nat. Hist.*, 1882, p. 337.—Zittel, *Handb. Pal.*, 2, 1885, p. 615.—Clarke, *Jour. Morph.*, 2, 1888, p. 254.—Hall and Clarke, *Pal. New York*, 7, 1888, p. 29.—Miller, *N. A. Geol. Pal.*, 1889, p. 542.—Beecher, *Amer. Jour. Sci.*, 3d ser., 46, 1893, p. 143.—Clarke, *Geol. Minnesota*, 3, pt. 2, 1894, p. 733.—Beecher, *Amer. Geol.*, 16, 1895, pp. 167, 174, 178.—Ehlert, *Bull. Soc. Geol. France*, 3d ser., 24, 1896, p. 112, fig. 29-31.—Beecher, *Amer. Jour. Sci.*, 4th ser., 3, 1897, pp. 104, 184, pl. 3, figs. 5-8, 29; Zittel-Eastman *Textb. Pal.*, 1, 1900, p. 637.—Grabau, *Bull. New York State Mus.*, 45, 1901, p. 223; *Bull. Buffalo Soc. Nat. Sci.*, 7, 1901, p. 223.—Lindstrom, *Kongl. Sven. Vet.-Akad. Handl.*, 34, No. 8, 1901, pp. 27, 52.—Jaekel, *Zeits. d. d. geol. Gesell.*, 53, 1901, p. 157.—Cumings, 32d Ann. Rep. *Dep. Geol. Nat. Res.*, Indiana, 1908, p. 1051.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 324.—Raymond, Zittel-Eastman *Textb. Pal.*, 1913, p. 726.

DALMANITES ARCHATES Billings. See *Pterygometopus achates*.

Dalmanites arkansanus Van Ingen.

Dalmanites (Synphoria) *arkansanus* Van Ingen, *School of Mines Quart.*, 23, 1901, p. 69, figs. 20-22, pl. figs. 33-37.

Dalmanites arkansanus Weller, *Bull. Chicago Acad. Sci., Nat. Hist. Surv.*, 4, pt. 2, 1907, p. 278, pl. 24, fig. 5.

Niagaran: St. Clair Springs, Independence County, Arkansas (St. Clair); near Lemont and Romeo, Illinois (Racine).

Dalmanites aspinosus Weller.

Dalmanites aspinosa Weller, *Pal. New Jersey*, 3, 1903, p. 252, pl. 22, fig. 1.—Maynard, *Maryland Geol. Surv., Low. Dev.*, 1913, p. 499, pl. 91, fig. 16.

Helderbergian: Two miles south Tristates, New York (Decker Ferry); Devil's Backbone, near Cumberland and Cash Valley, Maryland (Keyser).

Dalmanites bebyrx Billings.

Dalmanites Bebyrx Billings, *Canadian Nat. Geol.*, 5, 1860, p. 61, fig. 8; *Geol. Canada*, *Geol. Surv. Canada*, 1863, p. 187, fig. 185.

Trenton: Ottawa, Ontario.

Dalmanites bicornis (Hall).

Dalmania bicornis Hall, 28th Rep. New York State Mus. Nat. Hist. (doc. ed.), 1877, pl. 33, fig. 18, 1877.

Dalmanites bicornis Hall, 28th Rep. New York State Mus. Nat. Hist., Mus. ed., 1879, p. 196, pl. 33, fig. 18; 11th Rep. Dep. Geol. Nat. Hist. Indiana, 1882, p. 342, pl. 35, fig. 18.

Niagaran (Waldron): Waldron, Indiana; Tennessee.

DALMANITES BREVICEPS Miller. See *Chasmops breviceps*.

DALMANITES CALLICEPHALUS Billings. See *Pterygometopus callicephalus*.

DALMANITES CARLEYI Meek. See *Pterygometopus carleyi*.

DALMANITES CARLEYI ROGERSSENSIS Foerste. See *Pterygometopus carleyi rogersensis*.

Dalmanites danae (Meek and Worthen).

Dalmania Danae Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 264

Dalmanites danae Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 363, pl. 6, figs. 1a-1f.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 325.

Dalmanites danai Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 106, pl. 6, figs. 16, 17.

Upper Medinan (Edgewood): Near Thebes, Illinois; Edgewood and Louisiana, Missouri.

DALMANITES EBORACEUS Miller. See *Pterygometopus eboraceus*.

DALMANITES (PTERYGOMETOPUS) GOODRIDGEI Schuchert. See *Pterygometopus goodridgii*.

Dalmanites halli Weller.

Dalmania vigilans Hall (not Hall, 1862), 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 33, figs. 1-4.

Dalmanites vigilans Hall, *ibid.*, mus. ed., 1879, p. 193, pl. 33, figs. 1-4; 11th Rep. Dep. Geol. Nat. Hist. Indiana, 1882, p. 339, pl. 35, figs. 1-4; pl. 33, fig. 9.

Dalmanites halli Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 195.

Niagaran (Waldron): Waldron, Indiana.

Dalmanites illinoisensis Weller.

Dalmanites illinoisensis Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 275, pl. 25, figs. 1-2.

Niagaran (Racine): Joliet, Bonfield, etc., Illinois.

DALMANITES INTERMEDIUS Walcott. See *Pterygometopus intermedius*.

Dalmanites keyserensis Swartz.

Dalmanites keyserensis Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 499, pl. 91, figs. 8, 9.

Helderbergian (Keyser): Tonoloway, Maryland.

Dalmanites limulurus (Green).

Asaphus limulurus Green, Mon. Tril. N. A. 1832, p. 48.—Harlan, Trans. Geol. Soc. Pennsylvania, 1, pt. 1, 1834, p. 101.—Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 18, pl. 4, fig. 1.—Hall, Geol. New York, pt. 4, 1843, p. 101, figs. 1-2; tab. org. rem., 10, figs. 1-2.—Owen, Amer. Jour. Sci. Arts, 46, 1845, pp. 309-310, figs. 1, 2.

Dalmanites limulurus—Continued.

Phacops limulurus Hall, Pal. New York, 2, 1852, p. 303, pl. 67, figs. 1-8.—Billings, Can. Nat. Geol., 1, 1856, p. 57, pl. 1, fig. 7.

Dalmania limulurus Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 8, figs. 2, 3.—Hall, Pal. New York, 3, 1859, p. 357.

Dalmanites limulurus Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 320, fig. 340.—Chapman, Canadian Jour., n. s., 8, 1863, p. 31, fig. 145, p. 212, fig. 221; Expos. Min. Geol. Canada, 1864, p. 138, fig. 145; p. 184, fig. 221.—Miller, N. A. Geol. Pal., 1889, p. 543, fig. 998.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 188, figs.—Clarke, 45th Rep. New York State Mus., 1892, p. 355; 11th Rep. State Geol. New York for 1891, 1894, p. 39.—Grabau, Bul. New York State Mus., 45, 1901, pp. 223-224, fig. 155; Bull. Buffalo Soc. Nat. Sci., 1901, p. 224, fig. 155.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 325, fig. 1641.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 726, fig. 1408.

Asaphus caudatus Green, Mon. Tril. N. A., 1832, p. 50.—Eaton, Geol. Textb., 2d ed., 1832, p. 31, pl. 2, fig. 18.—Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 19.

Dalmania caudata Roemer, Sil. Fauna West Tennessee, 1860, p. 82, pl. 5, fig. 21.

Asaphus wetherilli Green, Mon. Tril. N. A., 1832, p. 57.—Harlan, Trans. Geol. Soc. Pennsylvania, 1, pt. 1, 1834, p. 101.

Asaphus edwardsi Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 19.

Asaphus cordieri Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 18, pl. 4, fig. 2.

Clinton (Rochester-Osgood): Rochester, Lockport, etc., New York; Ontario; Indiana; Tennessee; Maryland; Pennsylvania.

Plastotype.—Cat. No. 4954, U.S.N.M.

Dalmanites limulurus brevicaudatus Foerste.

Dalmanites limulurus brevicaudatus Foerste, Cincinnati Soc. Nat. Hist., Jour., 21, 1909, p. 35, pl. 2, figs. 20a-c.

Clinton (West Union): New Martins, Lewis County, Kentucky.

Dalmanites logani (Hall).

Dalmania logani Hall, Canadian Nat. Geol., 5, 1860, p. 156.—Dawson, Acadian Geol., Suppl. Chap., 1860, p. 68, fig. 64; *ibid.*, 2d ed., 1868, p. 608, fig. 215.

Silurian (Stonehouse): Arisaig, Nova Scotia.

Dalmanites lunatus Lambert.

Dalmanites lunatus Lambert, Bull. Geol. Soc. America, 15, 1904, p. 482, pl. 44, figs. 1-3, 5; Lambert in Hitchcock's Geol. of Littleton, 1905, pp. 33-38.

Silurian: Near Littleton, New Hampshire.

Cotypes.—Cat. No. 50459, U.S.N.M.

Dalmanites platycaudatus Weller.

Dalmanites platycaudatus Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 272, pl. 25, figs. 3-5.

Niagaran (Racine): Near Lemont, Illinois.

DALMANITES SCHMIDTI Miller. See *Pterygometopus schmidtii*.

DALMANITES TROOSTI Safford. See *Pterygometopus troosti*.

Dalmanites verrucosus (Hall).

Dalmania verrucosa Hall, 28th Rep. New York State Mus. Nat. Hist., Mus. ed., 1877, p. 195, pl. 33, figs. 5-17; pl. 34, figs. 13-15.

Dalmanites verrucosus—Continued.

- Dalmanites verrucosa* Hall, Trans. Albany Inst., 4, 1864, p. 218; 11th Rep. Dep. Geol. Nat. Hist. Indiana, 1882, p. 341, pl. 35, figs. 5-17; pl. 36, figs. 13-15.—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 191, figs.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 280, pl. 25, figs. 6-7.
- Niagaran: Waldron, Indiana; Tennessee (Waldron); Bonfield, and Jersey County, Illinois.

Dalmanites vigilans Hall.

- Dalmanites vigilans* Hall, Rep. Prog. Geol. Surv. Wisconsin, 1861, p. 51.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 276, pl. 24, figs. 1-4.
- Dalmania vigilans* Hall, Adv. sheets 18th Rep. New York State Cab. Nat. Hist., 1862, p. 31; Geol. Surv. Wisconsin, 1, 1862, p. 433, figs. 3-4; 20th Rep. New York State Cab. Nat. Hist., 1867, p. 335, figs. 1-2; p. 375, pl. 21, figs. 16-18; rev. ed., 1870, p. 426, figs. 13-14, pl. 21, figs. 16-18.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 195, fig.
- Dalmanites* (Synphoria) *vigilans* Van Ingen, School of Mines Quart., 23, 1901, p. 67, pl., figs. 28-32.—Kindle, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 485, pl. 23, figs. 4-7; pl. 24, fig. 20.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 325.
- Dalmanites* (Odontochile) *vigilans* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 699 (gen. ref.).
- Niagaran: Waukesha, Wauwatosa, etc., Wisconsin; Anderson and Pendleton, Indiana; Joliet and Lemont, Illinois; St. Clair Springs, Independence County, Arkansas.

DALMANITES VIGILANS Hall (1877). See *Dalmanites halli*.

Dalmanites werthneri Foerste.

- Dalmanites werthneri* Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 116; 2, 1887, p. 101, pl. 8, figs. 22, 22a, 23-25; Geol. Surv. Ohio, 7, 1895, p. 530, pl. 27, figs. 22, 22a, 23-25.
- Upper Medinan (Brassfield): Near Dayton, Ohio.

DANIA Edwards and Haime.

Genotype: *D. huronica* Edwards and Haime.

- Dania* Edwards and Haime, Compt. Rend. de l'Acad. Sci., 29, 1849, p. 261; Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, p. 154, 275.—Pictet, Traite de Pal., 2d ed., 1857, p. 443.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 280.—Nicholson, Tab. Corals Pal. Period, 1879, p. 327.—Zittel, Handb. Pal., 1, 1880, p. 617.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 461.—Miller, N. A. Geol. Pal., 1889, p. 184.

Dania huronica Edwards and Haime.

- Dania huronica* Edwards and Haime, Mon. Polyp. Foss. Terr. Pal. (Arch. Mus. Hist. Nat., 5), 1851, p. 275, pl. 18, fig. 2, 2a, 2b.—Milne Edwards, Hist. Nat. d. Corall., 3, 1860, p. 281.—Roemer, Leth. geog., Leth. Pal., 1883, p. 461, fig. 112.

Niagaran: Drummond Island, Lake Huron.

DAWSONIA Nicholson.

Genotype: *D. campanulata* Nicholson.

- "Ovarian vesicles of graptolites" Nicholson, Mon. British Grapt., pt. 1, 1872, p. 71.
- Dawsonia* Nicholson, Ann. Mag. Nat. Hist., 4th ser., 11, 1873, p. 139.—Nicholson and Lyddecke, Man. Pal., 1, 1889, p. 214.—Miller, N. A. Geol. Pal., 1889, p. 184.—James, Jour. Cincinnati Soc. Nat. Hist., 14, pt. 2, 1892, p. 162.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 738-740; *ibid.*, Mem. 11, pt. 2, 1908, p. 484.

Dawsonia acuminata Nicholson.

Dawsonia acuminata Nicholson, Ann. Mag. Nat. Hist., 4th ser., 11, 1873, p. 140, fig. 3a, a'.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 485, fig. 466.

Lower Ordovician: Point Levis, Quebec (Levis); Scotland (Llandeilo).

DAWSONIA CAMPANULATA Ruedemann. See *Azygograptus? simplex*.

Dawsonia monodon Gurley.

Dawsonia monodon Gurley, Jour. Geol., 4, 1896, p. 88, pl. 5, fig. 4.—Ruedemann, New York State Pal. Ann. Rep., 1902, pp. 554, 556; Mem. New York State Mus., 7, pt. 1, Addendum, 1904, pp. 741, 742, pl. 17, figs. 21–26, fig. 105.

Canadian: Point Levis, Quebec (Levis, *Didymograptus* zone); Deepkill, Rensselaer County, New York (Deepkill, *Tetragraptus* zone).

DAWSONIA ROTUNDA Nicholson. See *Acrothele rotunda*.

DAWSONIA SILIQUARIA James. See *Lockeia siliquaria*.

Dawsonia tenuistriata Nicholson.

Dawsonia tenuistriata Nicholson, Ann. Mag. Nat. Hist., 4th ser., 11, 1873, p. 141, fig. 3c, c', d, d'.

Canadian (Levis): Point Levis, Quebec.

Observation.—The specimens figured by Nicholson are very probably small brachiopods.

Dawsonia tridens Gurley.

Dawsonia tridens Gurley, Jour. Geol., 4, 1896, p. 88, pl. 5, fig. 5.—Ruedemann, New York State Pal. Ann. Rep., 1902, p. 556; Mem. New York State Mus., 7, pt. 1, Addendum, 1904, p. 741, pl. 17, figs. 18–20.

Canadian: Point Levis, Quebec (Levis, *Tetragraptus* zone); Deepkill, Rensselaer County, New York (Deepkill, *Tetragraptus* zone).

DAWSONOCERAS Hyatt. Genotype: *Orthoceras annulatum* Sowerby.

Dawsonoceras Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 276; Zittel-Eastman Textb. Pal., 1, 1900, p. 518; 2d ed., 1913, p. 599.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 82.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 58.

Dawsonoceras annulatum (Sowerby).

Orthoceras annulatum Sowerby, Min. Conch., 2, 1818, p. 77; Eaton, Geol. Textb., 2d ed., 1832, p. 29, pl. 3, fig. 24.—Hall, Nat. Hist. New York, Geol., 4, 1843, p. 110, fig. 1; tab. ill. 17, fig. 1; Pal. New York, 2, 1852, p. 96, pl. 29, fig. 3.—Marcou, Geol. Map United States and British Provinces, etc., 1853, p. 27, pl. 2, fig. 1.—Roemer, Sil. Fauna West Tennessee, Breslau, 1860, p. 78, pl. 5, figs. 18a, 18b.—Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 83.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868 (Extras, 1865), p. 351, pl. 20 (11), figs. 4–6 (see expl. of pls., p. 393); rev. ed., 1870, p. 411, pl. 20, figs. 4–6; pl. 24, figs. 2–4, p. 433.—Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1895, p. 147, pl. 9, fig. 1.—Whitfield, Geol. Wisconsin, 4, 1882, p. 298, pl. 19, fig. 1.—Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 324.—White, ibid., 1882, p. 358, pl. 38, fig. 1.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 194.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, 1884, pt. 1, p. 38.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 542, figs.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 215, fig. 147; Bull. New York State Mus., 45, 1901, p. 215, fig. 147.

Dawsonoceras annulatum—Continued.

- Orthoceras* (*Dawsonoceras*) cf. *annulatum* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 472, pl. 19, figs. 3, 4.
- Orthoceras* (*Cycloceras*) *annulatum* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 282, pl. 8, fig. 5.
- Dawsonoceras annulatum* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 58, figs. 1280, 1281.
- Orthoceras annulatum* var. *americanum* Foord, Cat. Fossil Ceph. British Mus., 1888, p. 56.—Whiteaves, Pal. Foss. Geol. Surv. Canada, 3, pt. 2, 1895, p. 101.
- Orthoceras* (*Dawsonoceras*) *annulatum* var. *americanum* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 472.
- Dawsonoceras annulatum* var. *americanum* Clarke and Ruedemann, New York State Mus., 5, 1903, p. 81, pl. 10, figs. 9–21; pl. 11, fig. 1.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 58.—Grabau, Michigan Geol. Surv., Geol. (1), 1909, p. 196, pl. 28, fig. 8; pl. 29, fig. 1.
- Orthoceras nodocostum* McChesney, Desc. New Fossils, 1861, p. 94; Plates Illust. N. Sp. Fossils, 1865, pl. 9, fig. 5.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 101.
- Orthoceras nodocostatum* McChesney, Trans. Chicago Acad. Sci., 1, 1868, p. 53, pl. 9, fig. 5.
- Orthoceras Laphami* McChesney, Desc. New Fossils, 1861, p. 91.
- Orthoceras bartonense* Spencer, Bull. Missouri State Mus., 1, 1884, p. 60, pl. 7, fig. 7; Trans. Acad. Sci. St. Louis, 4, 1884, p. 609, pl. 7, fig. 7.—Clarke and Ruedemann, Mem. New York State Mus., 5, p. 83.
- Orthoceras undulatum* Hall, Pal. New York, 2, 1852, p. 293, pl. 64, fig. 1a–f; pl. 65, fig. 3.
- Silurian: England; Gotland. Niagaran: New York; Canada; Ohio; Indiana; Tennessee; Wisconsin; etc. Upper Monroan: Michigan and Ontario.
- Observation.—Several species may be included in the above synonymy.

Dawsonoceras hammelli (Foerste).

- Orthoceras* (*Dawsonoceras*) *hammelli* Foerste, Bull. Sci. Lab., Denison Univ., 16, 1910, p. 74, pl. 1, fig. 4.
- Richmond: Dog Falls and Madison, Indiana; Jefferson County, Kentucky (Whitewater-Saluda); West Milton, Ohio (Elkhorn).

Dawsonoceras tenuilineatum Savage.

- Dawsonoceras tenuilineatum* Savage, Bull. Geol. Surv., Illinois, 23, 1913, p. 119, pl. 7, fig. 22.
- Upper Medinan: Pike County, Missouri (Edgewood); Will County, Illinois (Chanahan).

DEIPHON Barrande.Genotype: *D. forbesi* Barrande.

- Deiphon* Barrande, Neues Jahrb. Min., etc., 1850, p. 779.—Pictet, Traité de Pal., 2d ed., 2, 1854, p. 522.—Zittel, Handb. Pal., 2, 1885, p. 618.—Koken, Die Leitfossilien, Leipzig, 1896, p. 33.—Reed, Geol. Mag., dec. 4, 5, 1898, p. 211.—Beecher, Zittel-Eastman Textb. Pal., 1, 1900, p. 636.—Raymond, *ibid.*, 2d ed., 1913, p. 725.

Deiphon americanus Weller.

- Deiphon americanus* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, 1907, p. 268, pl. 24, fig. 14.
- Niagaran (Racine): Joliet, Romeo, etc., Illinois.

Deiphon forbesi Barrande.

- Deiphon forbesi* Barrande, Haidinger's Berichte, 1850, p. 6.—Salter, Mon. British Tril., 1865, p. 88, pl. 7, figs. 1–12.—Van Ingen, School of Mines Quart., 23, 1901, p. 35.

Delphon forbesi—Continued.

Sphaerexochus pisum Foerste, Geol. Surv. Ohio, 7, 1895, p. 528, pl. 37A, figs. 14a–14b.

Deiphon pisum Foerste, Amer. Jour. Sci., 4th ser., 18, 1904, p. 340.

Silurian: Bohemia and England; Dayton, Ohio (Brassfield); Lockport, New York (Rochester); Arkansas (St. Clair).

DEIPHON PISUM Foerste. See *Deiphon forbesi*.

DEIROCERAS Hyatt. See *Actinoceras* subgenus *Deiroceras*.

DEKAYELLA Ulrich.

Genotype: *Dekayella obscura* Ulrich

Dekayella Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 155; *ibid.*, 6, 1883, p. 90.—Miller, N. A. Geol. Pal., 1889, p. 184.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 372; Geol. Minnesota, 3, 1893, p. 269; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 273.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 589.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 31.—Cumings, Amer. Geol., 29, 1902, p. 200.—Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, pp. 24, 27.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 132.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 205; Zittel-Eastman Textb. Pal., 1913, p. 333.

DEKAYELLA CYSTATATA Cumings. See *Heterotrypa frondosa*.

Dekayella foliacea Ulrich and Bassler.

Dekayella foliacea Ulrich and Bassler, Smiths. Misc. Coll., Quart., 47, 1904, p. 28, pl. 7, figs. 10–12.

Trenton (Cynthiana): Lexington, Kentucky.

Holotype.—Cat. No. 43187, U.S.N.M.

Dekayella obscura Ulrich.

Dekayella obscura Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 89, pl. 1, figs. 4–4b; Zittel's Textb. Pal. (Engl. ed.), 1896, fig. 454 (p. 274).—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, figs. 180–182 (p. 589).—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 132.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 333, fig. 480.

Dekayia obscura Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 816, pl. 14, figs. 3, 3a.

Eden (McMicken): Cincinnati, Ohio, and vicinity.

Cotypes.—Cat. No. 43659, U.S.N.M.

DEKAYELLA PERFRONDOSA PROLIFICA Cumings. See *Heterotrypa subramosa prolifica*.

Dekayella prænuntia Ulrich.

Dekayella prænuntia Ulrich, Geol. Minnesota, 3, 1893, p. 270, pl. 23, figs. 32–47.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, figs. 177–179 (p. 589).—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 132, figs. 188b, 190b.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 205, 206, fig. 111.

Black River (Decorah): Minneapolis, etc., Minnesota; Iowa.

Middle Ordovician (Wassaleum and Kuckers): Esthonia, Russia.

Holotype.—Cat. No. 43528, U.S.N.M.

Dekayella prænuntia echinata Ulrich.

Dekayella prænuntia var. *echinata* Ulrich, Geol. Minnesota, 3, 1893, p. 271, pl. 23, figs. 32–38.

Black River (Decorah): Near Fountain, Minneapolis and St. Paul, Minnesota.

Cotypes.—Cat. No. 43530, U.S.N.M.

Dekayella prænuntia multipora Ulrich.

Dekayella prænuntia var. *multipora* Ulrich, Geol. Minnesota, 3, 1893, p. 272, pl. 23, figs. 44-47.

Black River (Decorah): Minneapolis, St. Paul, and Goodhue and Fillmore Counties, Minnesota.

Holotype.—Cat. No. 43531, U.S.N.M.

Dekayella prænuntia nœvigera Ulrich.

Dekayella prænuntia var. *nœvigera* Ulrich, Geol. Minnesota, 3, 1893, p. 271.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 207.

Black River (Decorah): Fillmore County, Minnesota.

Middle Ordovician (Wassaleu): Esthonia, Russia.

Holotype.—Cat. No. 43532, U.S.N.M.

Dekayella prænuntia simplex Ulrich.

Dekayella prænuntia var. *simplex* Ulrich, Geol. Minnesota, 3, 1893, p. 271, pl. 23, figs. 39-42.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 207, fig. 111.

Black River (Decorah): Minneapolis and St. Paul, Minnesota.

Middle Ordovician (Wassaleu): Esthonia, Russia.

Cotypes.—Cat. No. 43529, U.S.N.M.

DEKAYELLA ROBUSTA Foord. See Dekayella ulrichi.**Dekayella singularis (Ulrich).**

Heterotrypa singularis Ulrich, Geol. Surv. Illinois, 8, 1890, p. 415, pl. 37, figs. 3-3e; Geol. Minnesota, 3, 1893, p. 268.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, fig. 147 (p. 579).

Monticulipora singularis J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 77.

Dekayella singularis Ulrich and Bassler, Smiths. Misc. Coll. Quart., 47, 1904, p. 27 (gen. ref.).

Richmond (Fernvale): Wilmington, Illinois; Tennessee; Wisconsin.

Sections of *cotype*.—Cat. No. 43750, U.S.N.M.

Dekayella trentonensis (Ulrich).

Dekayia trentonensis Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1883, p. 151, pl. 6, figs. 6, 6a; Geol. Minnesota, 3, 1893, p. 274.

Dekayella trentonensis Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 227.—Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 42, pl. 1, fig. 3.

Trenton: Burgin and Frankfort, Kentucky (Wilmore); St. Paul and Cannon Falls, Minnesota (Prosser).

Holotype.—Cat. No. 43660, U.S.N.M.

Dekayella ulrichi (Nicholson).

Chaetetes Fletcheri (not Milne-Edwards and Haime) Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 504, pl. 29, figs. 6, 6a; Pal. Ohio, 2, 1875, p. 197, pl. 21, figs. 7, 7a; Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 90, pl. 5, fig. 14.—Quenstedt, Röhren- und Sternkorallen, 1891, p. 83, pl. 146, fig. 27.

Monticulipora (Heterotrypa) Ulrichii Nicholson, Genus *Monticulipora*, 1881, p. 131, fig. 22.

Monticulipora ulrichii Hall, 12th Ann. Rep. Indiana Geol. Nat. Hist., 1883, p. 249, pl. 11, fig. 10.—James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 179.—James, *ibid.*, 16, 1894, p. 201.

Dekayella ulrichi Ulrich, Jour. Cincinnati Soc. Nat. Hist., 7, 1883, pp. 91, 153.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 227.—Cumings, Amer. Geol., 28, 1901, p. 374.—Nickles, Bull. Kentucky Geol. Surv., 5,

Dekayella ulrichi—Continued.

- 1905, p. 47, pl. 2, fig. 4.—Basler, Proc. U. S. Nat. Mus., 30, 1906, p. 35, pl. 2, figs. 13, 14.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 132.
- Dekayia ulrichi* Cumings, Amer. Geol., 29, 1902, p. 13, pl. 9, fig. 1; 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 824, pl. 14, figs. 4, 4b; pl. 28, fig. 7.
- Dekayella robusta* Foord, Ann. Mag. Nat. Hist. (5), 13, 1884, p. 341, pl. 12, figs. 2-2d.
- Dekayella ulrichi-robusta* Nickles and Basler, Bull. U. S. Geol. Surv., 173, 1900, p. 228.
- Dekayia ulrichi-robusta* Cumings, Amer. Geol., 29, 1902, p. 212, pl. 9, fig. 4, pl. 10, fig. 9; 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 826, pl. 14, fig. 2, 2b; pl. 27, fig. 22.
- Monticulipora ohioensis* James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 183; *ibid.*, 16, 1894, p. 207.
- Eden: Cincinnati, Ohio, and vicinity.

DEKAYELLA ULRICHI var. **ROBUSTA** Nickles and Basler. See *Dekayella ulrichi*.

DEKAYIA Milne-Edwards and Haime.

Genotype: *D. aspera* Milne-Edwards and Haime.

- Dekayia* Milne-Edwards and Haime, Pol. Foss. Terr. Pal., 1851, p. 277—Pictet, *Traite de Pal.*, 2d ed., 1857, p. 443.—Milne-Edwards, *Hist. Nat. des Corall.*, 3, 1860, p. 283.—Nicholson, *Pal. Tab. Corals*, 1879, p. 291; Zittel *Handb. Pal.*, 1, 1880, p. 615; Genus *Monticulipora*, 1881, p. 98.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 155; *ibid.*, 6, 1883, p. 148.—Roemer, *Leth. geog.*, pt. 1, *Leth. Pal.*, 1883, p. 479.—Waagen and Wentzel, *Pal. Indica* (13), 1886, p. 874.—James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 28.—Miller, N. A. Geol. Pal., 1889, p. 184.—Ulrich, *Geol. Surv. Illinois*, 8, 1890, pp. 371, 415.—Rominger, *Amer. Geol.*, 6, 1890, pp. 105-106-114.—Ulrich, *Geol. Minnesota*, 3, 1893, p. 274; Zittel's *Textb. Pal. (Engl. ed.)*, 1896, p. 273.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1896, p. 115.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 578.—Nickles and Basler, Bull. U. S. Geol. Surv., 173, 1900, p. 31.—Cumings, *Amer. Geol.*, 29, 1902, p. 197.—Ulrich and Basler, *Smiths. Misc. Coll. Quart.*, 47, 1904, p. 24.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1907, p. 743.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 133.—Basler, Zittel-Eastman *Textb. Pal.*, 1913, p. 333.

Dekayia appressa Ulrich.

- Dekayia appressa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 7, 1883, p. 152, pl. 6, figs. 7-7b.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 809, pl. 13, fig. 3.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

Holotype.—Cat. No. 43655, U.S.N.M.

Dekayia aspera Milne-Edwards and Haime.

- Dekayia aspera* Milne-Edwards and Haime, Pol. Foss. Terr. Pal., 1851, p. 278, pl. 16, figs. 2, 2a.—Milne-Edwards, *Hist. Nat. des Corall.*, 3, 1860, p. 283.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 148, pl. 6, 5; Zittel's *Textb. Pal. (Engl. ed.)*, 1896, fig. 455, p. 274.—Miller, N. A. Geol. Pal., 1889, p. 184, fig. 165.—Cumings, *Amer. Geol.*, 29, 1902, p. 214, pl. 9, fig. 10; pl. 10, fig. 10.—Nickles, Bull. Kentucky Geol. Surv., 5, p. 54, pl. 3, fig. 4.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 133, fig. 190c.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 810, pl. 13, figs. 5-5b; pl. 27, fig. 20.—Basler, Zittel-Eastman *Textb. Pal.*, 1913, p. 333, fig. 481.

Monticulipora (Dekayia) aspera James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 28.—James, *ibid.*, 18, 1896, p. 116.

Dekayia aspera—Continued.

Chaetetes attritus Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 503, pl. 30, fig. 4, 4a; Pal. Ohio, 2, 1875, p. 194, pl. 21, fig. 4.—Buell, Trans. Wisconsin Acad. Sci., 5, 1882, p. 191.

Monticulipora (*Chaetetes*) *attritus* Chamberlin, Geol. Wisconsin, 1, 1883, p. 172, fig.

Dekayia attrita Nicholson, Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 93, pl. 5, figs. 12, 12a; Pal. Tabulate Corals, 1879, p. 298, pl. 15, figs. 1–1c.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity; Nashville and Columbia, Tennessee.

DEKAYIA ATTRITA Nicholson. See *Dekayia aspera*.

DEKAYIA FRONDOSA Cumings. See *Heterotrypa frondosa*.

DEKAYIA FRONDOSA var. **CYSTATA** Cumings. See *Heterotrypa frondosa*.

DEKAYIA INFLECTA Cumings. See *Heterotrypa inflecta*.

Dekayia maculata James.

Dekayia maculata James, Paleontologist, No. 5, 1881, p. 37.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 35, pl. 2, figs. 13, 14.

Monticulipora (*Dekayia*) *maculata* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1896, p. 116, fig. 11.

Eden (McMicken): Loveland and Cincinnati, Ohio, and vicinity.

Dekayia magna Cumings.

Dekayia magna Cumings, Amer. Geol., 28, 1901, p. 375, pl. 34, figs. 1–6; 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 815, pl. 13, figs. 6, 6a; pl. 28, fig. 8.

Maysville (Bellevue): Vevay, etc., Indiana; Cincinnati, Ohio, and vicinity.

Dekayia multispinosa Ulrich.

Dekayia multispinosa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 154, pl. 6, figs. 8, 8a.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

Holotype.—Cat. No. 43656, U.S.N.M.

DEKAYIA OBSCURA Cumings. See *Dekayella obscura*.

DEKAYIA PAUPERA Ulrich. See *Heterotrypa paupera*.

Dekayia pelliculata Ulrich.

Dekayia pelliculata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 150, pl. 6, figs. 9, 9a.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 818, pl. 13, figs. 4, 4a; pl. 28, fig. 5.

Monticulipora (*Dekayia*) *pelliculata* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1896, p. 117.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

Section of *holotype*.—Cat. No. 43657, U.S.N.M.

DEKAYIA PERFRONDOSA Cumings. See *Heterotrypa frondosa*.

DEKAYIA PERFRONDOSA-SUBPULCHELLA Cumings. See *Heterotrypa subpulchella*.

DEKAYIA PROLIFICA Cumings. See *Heterotrypa subramosa prolifica*.

DEKAYIA SUBFRONDOSA Cumings. See *Heterotrypa subfrondosa*.

DEKAYIA SUBPULCHELLA Cumings. See *Heterotrypa subpulchella*.

DEKAYIA SUBRAMOSA Cumings. See *Heterotrypa subramosa*.

DEKAYIA TRENTONENSIS Ulrich. See *Dekayella trentonensis*.

DEKAYIA ULRICHI Cumings. See *Dekayella ulrichi*.

DEKAYIA ULRICHI-EXPANSA Cumings. See *Heterotrypa lobata*.

DEKAYIA ULRICHI-LOBATA Cumings. See *Heterotrypa lobata*.

DEKAYIA ULRICHI var. **ROBUSTA** Nickles and Bassler. See *Dekayella ulrichi*.

DELTACRINUS Ulrich.

Genotype: *Cheirocrinus clarus* Hall.

Deltacrinus Ulrich, 14th Rep. Geol. Surv. Minnesota, 1886, p. 109, fig. 2.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 201 (Rev. Pal., 3, sec. 2, p. 277).—Miller, N. A. Geol. Pal., 1889, p. 237.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 148.—Springer, Zittel-Eastman Textb. Pal., 2d. ed., 1913, p. 213.

Calceocrinus (part) Hall, 23th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, footnote, pl. 9; *ibid.*, Mus. ed., 1879, p. 146, figs. 1, 2; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 281.

Deltacrinus alleni (Rowley).

Calceocrinus alleni Rowley, Amer. Geol., 34, 1904, p. 275, pl. 16, figs. 30-33.

Upper Medinan (Edgewood): Watson Station, Pike County, Missouri.

Deltacrinus contractus (Ringueberg).

Calceocrinus contractus Ringueberg, Annals New York Acad. Sci., 4, 1889, p. 404, pl. 10, fig. 12.

Deltacrinus contractus Kindle, U. S. Geol. Surv., Geol. Atlas, U. S., folio 190, 1913, pp. 1-25, pls.

Niagaran (Lockport-Gasport member): Lockport, New York.

Deltacrinus halli (Ringueberg).

Calceocrinus sp. Hall, Pal. New York, 2, 1847, p. 352, pl. 85, figs. 5, 6.

Calceocrinus halli Ringueberg, Annals New York Acad. Sci., 4, 1889, p. 403, pl. 10, fig. 9.

Clinton (Rochester): Middleport, New York.

Observation.—Hall based the genus *Calceocrinus* upon the specimen figured in 1847, but not named specifically.

Deltacrinus indianensis (Miller).

Calceocrinus indianensis Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 645, pl. 6, fig. 37. (Adv. sheets, 1891, p. 35.)

Niagaran (Laurel): St. Paul, Indiana.

Deltacrinus stigmatus (Hall).

Cheirocrinus stigmatus Hall, Trans. Albany Inst., 4, 1863, p. 225. (Abstract, p. 31.)

Calceocrinus stigmatus Shumard, Trans. Acad. Sci. St. Louis (Cat. Pal. Foss.), 2, 1866, p. 358.—Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, 1877, pl. 19, figs. 9-11; mus. ed., 1879, p. 147, pl. 19, figs. 9-11; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 281, pl. 19, figs. 9-11.

Deltacrinus stigmatus Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Minnesota, 1886, p. 111, 113 (gen. ref.).

Niagaran (Waldron): Waldron, Indiana.

Deltacrinus tunicatus (Hall).

Calceocrinus tunicatus Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 147, fig. 1; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 281, fig. 1.

Niagaran (Waldron): Waldron, Indiana.

Deltacrinus typus (Ringueberg).

Calceocrinus typus Ringueberg, Annals New York Acad. Sci., 4, 1889, p. 402, pl. 10, fig. 8.

Clinton (Rochester): Lockport, New York.

DELTHYRIS ACUTILIRATA Conrad. See *Platystrophia acutilirata*.

DELTHYRIS BIALVEATA Conrad. See *Spirifer (Eospirifer) radiatus*.

DELTHYRIS BRACHYNOTA Hall. See *Platystrophia biforata*.

DELTHYRIS CRISPA Dalman. See *Spirifer (Delthyris) crispus*.

DELTHYRIS DECEMPPLICATUS Hall. See *Spirifer (Delthyris) sulcata*.

DELTHYRIS EXPANSUS Emmons. See *Pterotheca expansa*.

DELTHYRIS LYNX Hall. See *Platystrophia biforata* and *P. lynx*.

DELTHYRIS NIAGARENSIS Owen. See *Spirifer (Delthyris) niagarensis*.

DELTHYRIS PLOCATUS Owen. See *Spirifer (Delthyris) vanuxemi*.

DELTHYRIS RADIATA Billings. See *Spirifer (Eospirifer) radiatus*.

DELTHYRIS RUGATINA Conrad. See *Spirifer (Eospirifer) sulcata*.

DELTHYRIS? RUGICOSTA Schuchert. See *Spirifer (Delthyris) rugicosta*.

DELTHYRIS SINUATUS Hall. See *Bilobites bilobus*.

DELTHYRIS STAMINEA Hall. See *Spirifer (Delthyris) crispus*.

DELTHYRIS SULCATA Hisinger. See *Spirifer (Delthyris) sulcata*.

DELTOCERAS Hyatt.

Genotype: *D. planum* Hyatt.

Deltoceras Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 449.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 772.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 480.

Deltoceras planum Hyatt.

Deltoceras planum Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 450.

Canadian (Quebec): Port au Choix, Newfoundland.

Deltoceras vaningeni Ruedemann.

Deltoceras vaningeni Ruedemann, Bull. New York State Mus., 90, 1906, p. 490, pls. 25-28, figs. 39-41.

Chazy (Crown Point): Valcour Island, New York.

DEMIRASTRITES URCEOLUS Eisel. See *Monograptus urceolus*.

DENDROCLONELLA Rauff.

Genotype: *D. rugosa* Rauff.

Dendroclonella Rauff, Palaeontographica, 41, 1895, p. 252.

Dendroclonella rugosa Rauff.

Dendroclonella rugosa Rauff, Palaeontographica, 41, 1895, p. 252, pl. 18, figs. 8, 3-6; pl. 24, fig. 1.

Niagaran (Brownsport): Perry County, Tennessee.

DENDROCRINUS Hall.Genotype: *D. longidactylus* Hall.

Dendrocrinus Hall, Pal. New York, 2, 1852, p. 193.—Pictet, *Traite de Pal.*, 2d ed., 4, 1857, p. 317.—Billings, *Geol. Surv. Canada, Rep. Progr.* for 1853–1856, 1857, p. 264; *Geol. Surv. Canada*, dec. 4, 1859, p. 35, fig. 14.—Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 208.—Meek, *Geol. Surv. Ohio, Pal.*, 1, 1873, p. 20.—Zittel, *Handb. Pal.*, 1, 1879, p. 361.—Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1879, pp. 285, 289, 298 (*Rev. Pal.*, pt. 1, pp. 62, 66, 75); *ibid.*, 1885, pp. 115, 116; *ibid.*, 1890, pp. 380–384; *Amer. Jour. Sci.*, 3d ser., 26, 1883, p. 376, fig. 5.—Miller, *N. A. Geol. Pal.*, 1889, p. 238, fig. 282.—Bather, *Ann. Mag. Nat. Hist.*, 6th ser., 5, 1890, p. 324, pl. 14, fig. 15; pl. 15, fig. 4; *Treatise on Zool.*, pt. 3, *Echinoderma*, London, 1900, p. 179, fig. 96.—Wachsmuth, *Zittel-Eastman Textb. Pal.*, 1, 1900, p. 155.—Zittel, *Grundzuge Pal.*, 1, 1910, p. 132.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 711.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 504.—Springer, *Geol. Surv. Canada, Mem.* 15P, 1911, p. 29; *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 215.

Dendrocrinus acutidactylus Billings.

Dendrocrinus acutidactylus Billings, *Geol. Surv. Canada, Rep. Progr.*, 1853–1856, 1857, p. 266; *Geol. Surv. Canada*, dec. 4, 1859, p. 37, pl. 3, figs. 2a, b.

Trenton (Curdsville): Montreal, Quebec; Mercer County, Kentucky.

Dendrocrinus alternatus (Hall).

Poteriocrinus alternatus Hall, Pal. New York, 1, 1847, pp. 83, 316, pl. 28, figs. 1a–f.—Emmons, *Amer. Geology*, 1, pt. 2, 1855, p. 224, fig. 77.

Cyathocrinus? *alternatus* Hall, Pal. New York, 1, 1847, p. 316.

Homocrinus alternatus Hall, Pal. New York, 2, 1852, p. 185.

Dendrocrinus alternatus Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1879, p. 299 (*Rev. Pal.*, pt. 1, p. 76).

Trenton: Turin, Lowville, Middleville, etc., New York.

DENDROCRINUS ANCILLA Hall. See *Homocrinus ancilla*.

DENDROCRINUS ANGULATUS Billings. See *Palaocrinus angulatus*.

Dendrocrinus angustatus (Meek and Worthen).

Homocrinus angustatus Meek and Worthen, *Proc. Acad. Nat. Sci. Philadelphia*, 1870, p. 30; *Geol. Surv. Illinois*, 6, 1875, p. 492, pl. 23, fig. 8.

Dendrocrinus angustatus Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1879, p. 299 (*Rev. Pal.*, pt. 1, p. 76).

Richmond (Maquoketa): Mount Carroll, Illinois.

Dendrocrinus caduceus (Hall).

Poteriocrinus (*Dendrocrinus*) *caduceus* Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 208, pl. 5, figs. 7, 8 (adv. sheets 1866, p. 3; 1871, pl. 1, figs. 7, 8).

Poteriocrinites (*Dendrocrinus*) *caduceus* Meek, *Geol. Surv. Ohio, Pal.*, 1, 1873, p. 26, pl. 3 bis, figs. 1a–d.—Lesley, *Geol. Surv. Pennsylvania, Rep.* P 4, 1889, p. 738, figs.

Dendrocrinus caduceus Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1879, p. 299 (*Rev. Pal.*, pt. 1, p. 76); *ibid.*, 1890, p. 392, pl. 10, fig. 11.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 505, fig. 1819.

Richmond (Waynesville-Liberty): Near Lebanon, etc., Ohio.

Dendrocrinus casei Meek.

Pentacrinite Christy, *Letters on Geology*, 1848, pl. 2.

Dendrocrinus Casei Meek, *Amer. Jour. Sci.*, 3d ser., 2, 1871, p. 295.—Foerste, *Amer. Geol.*, 12, 1893, pp. 270, 340.—Bather, *Geol. Mag.*, dec. 4, 6, 1899, p. 35,

Dendrocrinus casei—Continued.

fig. 13; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 120, fig. 26, 3.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 717, pl. 4, figs. 2, 2b.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 505.

Poteriocrinites (*Dendrocrinus*) *Casei* Meek, Geol. Surv. Ohio, 1, pt. 2, 1873, p. 28, pl. 3 bis, figs. 2a-c.

Poteriocrinites (*Dendrocrinus*) *caseyi* Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 739, fig.

Richmond (Whitewater): Richmond, Indiana; Oxford, etc., Ohio.

Dendrocrinus celsus Ringueberg.

Dendrocrinus celsus Ringueberg, Proc. Acad. Nat. Sci. Philadelphia, 1888, p. 132, pl. 7, fig. 3.

Clinton (Rochester): Lockport, New York.

Dendrocrinus cincinnatiensis (Meek).

Poteriocrinites (*Dendrocrinus*) *Cincinnatiensis* Meek, Proc. Acad. Nat. Sci. Philadelphia, 1871, p. 312; Geol. Surv. Ohio, Pal., 1, 1873, p. 20, pl. 3 bis, figs. 5a, b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 739, figs.

Dendrocrinus Cincinnatiensis Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 299 (Rev. Pal., pt. 1, p. 76).—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 505, fig. 1818.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

DENDROCRINUS CONJUGANS Billings. See *Cupulocrinus conjugans*.

DENDROCRINUS CURTUS Ulrich. See *Merocrinus curtus*.

DENDROCRINUS CYLINDRICUS Billings. See *Cupulocrinus conjugans*.

Dendrocrinus dyeri (Meek).

Poteriocrinites (*Dendrocrinus*) *Dyeri*, Meek, Proc. Acad. Nat. Sci. Philadelphia, 1872, p. 310; Geol. Surv. Ohio, Pal., 1, 1873, p. 24, pl. 3 bis, figs. 3a, b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 739, figs.

Dendrocrinus Dyeri Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 299 (Rev. Pal., pt. 1, p. 76).

Trenton (Upper): River quarries, Covington, Kentucky.

Dendrocrinus erraticus Miller.

Dendrocrinus erraticus Miller, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 316, pl. 8, figs. 1, 1a.

Richmond: Drift at Cincinnati, Ohio.

Dendrocrinus gracilis (Hall).

Poteriocrinus gracilis Hall (not McCoy), Pal. New York, 1, 1847, p. 84, pl. 28, figs. 2a-f.

Poteriocrinus subgracilis D'Orbigny, Prodrome Pal., 1, 1849, p. 23.

Homocrinus gracilis Hall, Pal. New York, 2, 1852, p. 158.

Poteriocrinites *gracilis* Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 21, footnote.

Dendrocrinus gracilis Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 299 (Rev. Pal., pt. 1, p. 76).

Trenton: Middletown, New York.

Dendrocrinus gregarius Billings.

Dendrocrinus gregarius Billings, Geol. Surv. Canada, Rep. Progr. 1853-1856, 1857, p. 265; Geol. Surv. Canada, dec. 4, 1859, p. 86, pl. 3, figs. 1a-c.

Trenton: Ottawa, Ontario.

DENDROCRINUS HUMILIS Billings. See *Cupulocrinus humilia*.

DENDROCRINUS JEWETTI Billings. See *Cupulocrinus jewetti*.

DENDROCRINUS LATIBRACHIATUS Billings. See *Cupulocrinus latibrachiatus*.

Dendrocrinus longidactylus Hall.

Dendrocrinus longidactylus Hall, Pal. New York, 2, 1852, p. 193, pl. 43, figs. 1a-k; pl. 42, figs. 7a, b.—Pictet, *Traite de Pal.*, 2d ed., 4, 1857, p. 317, pl. 100, fig. 14.—Bather, *Geol. Mag.*, dec. 4, 6, 1899, p. 35, fig. 12; *Treatise on Zool.*, pt. 3, *Echinoderma*, London, 1900, p. 120, figs. 26, 2.—Springer, *Mem. Geol. Surv. Canada*, 15P, 1911, p. 29, fig. 1.

Clinton (Rochester): Lockport, New York.

Dendrocrinus modestus Safford.

Dendrocrinus modestus Safford, *Geol. Tennessee*, 1869, p. 285 (not defined).

Stones River (Lebanon): Central basin of Tennessee.

Dendrocrinus navigiolum Miller.

Dendrocrinus navigiolum Miller, *Jour. Cincinnati Soc. Nat. Hist.*, 3, 1880, p. 235, pl. 7, figs. 5, 5a (6, 6a).

Eden (Fulton): First Ward, Cincinnati, Ohio.

Dendrocrinus? nodobrachiatus Ringueberg.

Dendrocrinus? nodobrachiatus Ringueberg, *Annals New York Acad. Sci.*, 5, 1890, p. 303, pl. 3, fig. 6.

Niagaran (Lockport-Gasport member): Lockport, New York.

DENDROCRINUS NUCLEUS Hall. See *Botryocrinus nucleus*.

Dendrocrinus Oswegoensis Meek and Worthen.

Dendrocrinus Oswegoensis Meek and Worthen, *Geol. Surv. Illinois*, 3, 1868, p. 333, pl. 4, fig. 4.—Miller, *N. A. Geol. Pal.*, 1889, p. 238, fig. 284.

Richmond (Maquoketa): Oswego, Kendall County, Illinois.

DENDROCRINUS POLYDACTYLUS Wachsmuth and Springer. See *Cupulocrinus polydactylus*.

Dendrocrinus posticus (Hall).

Poteriocrinus posticus Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 209, pl. 5, figs. 5, 6 (extract 1871, pl. 1, figs. 5, 6.).

Poteriocrinites (*Dendrocrinus*) *posticus* Meek, *Geol. Surv. Ohio, Pal.*, 1, 1873, p. 22, pl. 3 bis, figs. 4a-c.—Lealey, *Geol. Surv. Pennsylvania, Rep. P* 4, 1889, p. 740, figs.

Dendrocrinus posticus Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1879, p. 300 (*Rev. Pal.*, pt. 1, p. 77).

Richmond (Waynesville-Liberty): Southwestern Ohio.

Dendrocrinus proboscidiatus Billings.

Dendrocrinus proboscidiatus Billings, *Geol. Surv. Canada, Rep. Progr. for* 1853-56, 1857, p. 267; *Geol. Surv. Canada*, dec. 4, 1859, p. 38, pl. 3, figs. 3a-c; *Ottawa Nat.*, 1, 1887, p. 53, pl. figs.—Springer, *Mem. Geol. Surv. Canada*, 15 P, 1911, p. 37, (loc. occ.)

Trenton (Curdsville): Montreal, Quebec; Kirkfield, Ontario.

Dendrocrinus retractilis Walcott.

Dendrocrinus retractilis Walcott, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 211, pl. 17, fig. 4.

Trenton: Trenton Falls, New York.

Dendrocrinus rusticus Billings.

Dendrocrinus rusticus Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 270; Geol. Surv. Canada, dec. 4, 1859, p. 41, pl. 3, figs. 7a, 7b.

Trenton: Ottawa, Ontario.

DENDROCRINUS (HOMOCRINUS) SCOPARIUS Wachsmuth and Springer. See *Lasiocrinus scoparius*.

Dendrocrinus similis Billings.

Dendrocrinus similis Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 267; Geol. Surv. Canada, dec. 4, 1859, p. 40.

Trenton: Ottawa, Ontario.

Dendrocrinus tener Billings.

Dendrocrinus tener Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 9.

Richmond (Charleton): West End, Anticosti.

Observation.—Not recognized. Twenhofel reports the specimen as too poor for determination.

DENDROCYSTIS Haeckel. See *Dendrocystites* Barrande.

DENDROCYSTITES Barrande.

Genotype: *D. sedgwicki* Barrande

?*Syringocrinus* Billings, Canadian Org. Rem., dec. 4, 1859, p. 65.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 411 (Rev. Pal., pt. 2, p. 237).—Miller, N. A. Geol. Pal., 1889, p. 285.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 203.—Zittel, Grundzuge Pal., 1, 1910, p. 156.

Dendrocystites Barrande, Extraits du Syst. Silur., 1887, p. 219; Syst. Silur. Boheme, 7, p. 142.—Jaekel, Zeitschr. deutsch. geol. Gesell., 52, 1901, p. 673.

Dendrocystis Haeckel, Amphor. und Cystoid., 1, 1900, p. 47.—Delage and Herouard, Zool. Concrete, 3, 1904, p. 408.—Bather, Roy. Soc. Edinburgh, 49, pt. 2, 1913, p. 371, text figs. 6-9.

Dendrocystites? paradoxa (Billings).

Syringocrinus paradoxus Billings, Geol. Surv. Canada, dec. 4, 1859, p. 65, pl. 10, fig. 14.

Syringocrinus paradoxus Bather, Treatise on Zool., Echinoderma, 1900, p. 48.

Dendrocystis(?) paradoxa Bather, Trans. Roy. Soc. Edinburgh, 49, pt. 2, 1913, p. 397, fig. 13.

Trenton: Beaufort, near Quebec, Canada.

Observation.—See Bather (op. cit., 1913) for discussion of *Syringocrinus* and *S. paradoxa*.

DENDROGRAPTUS Hall.

Genotype: *D. hallianus* Prout.

Dendrograptus Hall, Geol. Surv. Canada for 1857, Rep. Progr., 1858, p. 143; Rep. Geol. Surv. Wisconsin, 1, 1862, p. 21; Geol. Surv. Canada, dec. 2, p. 126, 127, figs. a, b, c.—Nicholson, Quart. Jour. Geol. Soc. London, 24, 1868, p. 142.—Carruthers, Geol. Mag., 5, 1868, p. 73, 130.—Hall, 20th Rep. New York State Cab. Hist., 1868, p. 218; rev. ed., p. 252.—Nicholson, Mon. British Grapt., 1872, p. 127.—Zittel, Handb. Pal., 1, 1879, p. 289.—Spencer, Bull. Mus. Univ. State Missouri, 1, 1884, p. 16; Trans. Acad. Sci. St. Louis, 4, 1884, p. 262, 566.—Miller, N. A. Geol. Pal., 1889, p. 184.—James, Jour. Cincinnati Soc. Nat. Hist., 14, pt. 2, 1892, p. 151.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 165.—Roemer and Frech, Leth. geog., 1, Theil, Leth. Pal., 1, 3 Lief., 1897, p. 577.—Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. xli.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 578, 579.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 26.—Ruedemann, Zittel-Eastman Textb., Pal., 2d. ed., 1913, p. 128.

DENDROGRAPTUS ARUNDINACEUS Gurley. See *Mastigograptus arundinaceus*.

DENDROGRAPTUS COMPACTUS Walcott. See *Callograptus compactus*.

Dendrograptus dawsoni Spencer.

Dendrograptus dawsoni Spencer, Canadian Nat., 10, 1882, p. 165; Trans. Acad. Sci. St. Louis, 4, 1884, p. 568, pl. 1, fig. 5; Bull. Mus. Univ. Missouri, 1, 1884, p. 18, pl. 1, fig. 5.—Gurley, Jour. Geol., 4, 1896, pp. 94, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 6, fig. 1.

Niagaran dolomite: Hamilton, Ontario.

DENDROGRAPTUS? (CALLOGRAPTUS?) DIFFUSUS Hall. See *Callograptus diffusus*.

Dendrograptus divergens Hall.

Dendrograptus divergens Hall, Geol. Surv. Canada, dec. 2, 1865, p. 129, pl. 17, figs. 3, 4.—Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 664, pl. 36, figs. 6a, b.

Canadian (Levis, *Didymograptus* zone): Point Levis, Quebec.

Dendrograptus dubius Miller.

Dendrograptus simplex Spencer, Canadian Nat., 10, 1882, p. 165 (nom. nud.); Trans. Acad. Sci. St. Louis, 4, 1884, p. 567, pl. 1, fig. 4; Bull. Mus. Univ. State Missouri, 1, 1884, p. 17, pl. 1, fig. 4.

Dendrograptus dubius Miller, N. A. Geol. Pal., 1889, p. 184.—Gurley, Jour. Geol., 4, 1898, pp. 94, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 7, 8, figs. 2, 8.

Niagaran dolomite: Hamilton, Ontario.

Dendrograptus erectus Hall.

Dendrograptus erectus Hall, Geol. Surv. Canada, dec. 2, 1865, p. 130, pl. 17, fig. 7. Canadian (Levis, *Didymograptus* zone): Point Levis, Quebec.

Dendrograptus flexuosus Hall.

Dendrograptus flexuosus Hall, Geol. Surv. Canada, Can. Org. Rem., dec. 2, 1865, p. 127, pl. 17, figs. 1, 2, p. 128, fig. 3; 20th Rep. New York State Cab. Nat. Hist., 1868, p. 177, fig. 9; rev. ed., 1870, p. 209, fig. 9, p. 224.—Hopkinson and Lapworth, Quar. Jour. Geol. Soc., 31, 1875, p. 662, pl. 36, figs. 3a–3d.—Roemer and Frech, Leth. Pal., 1, 1897, p. 578.—Ruedemann, Mem. New York State Mus., 7, 1904, p. 579, pl. 4, figs. 5, 6, 8–10.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 26, fig. 37.

Dendrograptus cf. *gracilis* Ruedemann, New York State Pal. Ann. Rep., 1902, p. 555.

Canadian: Point Levis, Quebec (Levis, *Diplograptus dentatus* zone); Deepkill, New York (Deepkill, *D. dentatus* zone). Lower and Middle Arenig of Wales.

Dendrograptus fluitans Ruedemann.

Dendrograptus n. sp. Ruedemann, New York State Pal. Ann. Rep., 1902, p. 555.

Dendrograptus fluitans Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 582–583, pl. 4, figs. 11, 12.

Canadian (Deepkill): Deepkill, Reneselaer County, New York (*Tetragraptus* zone).

Dendrograptus frondosus Spencer.

Dendrograptus frondosus Spencer, Canadian Nat., 10, 1882, p. 165 (nom. nud.); Trans. Acad. Sci. St. Louis, 4, 1884, p. 568, pl. 1, fig. 6; Bull. Mus. Univ. State Missouri, 1, p. 18, pl. 1, fig. 6, 6a.—Gurley, Jour. Geol., 4, 1896, pp. 64, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 8, fig. 7.

Niagaran dolomite: Hamilton, Ontario.

Dendrograptus fruticosus Hall.

Dendrograptus fruticosus Hall, Geol. Surv. Canada, dec. 2, 1865, p. 131, pl. 17, figs. 8, 9.

Canadian (Levis, *Didymograptus dentatus* zone): Point Levis, Quebec.

Dendrograptus gracilis Hall.

Dendrograptus gracilis Hall, Geol. Surv. Canada, dec. 2, 1865, p. 132, pl. 18, figs. 5-6; 20th Rep. New York State Cab. Nat. Hist., 1868, p. 199, pl. 4, fig. 11; rev. ed., 1870, p. 230, pl. 4, fig. 11; p. 224.

Canadian (Levis, *Didymograptus* zone): Point Levis, Quebec.

DENDROGRAPTUS cf. **GRACILIS** Ruedemann. See *Dendrograptus flexuosus*.

DENDROGRAPTUS GRACILIS var. **CRASSA** James. See *Buthotrephis gracilis crassa*.

DENDROGRAPTUS (PSILOPHYTON) GRACILLIMUS Walcott. See *Mastigograptus gracillimus*.

DENDROGRAPTUS GRACILLIMUS var. **INTERMEDIA** James. See *Buthotrephis gracilis intermedia*.

DENDROGRAPTUS LINEARIS Cartuthers. See *Pleurograptus linearis*.

DENDROGRAPTUS NOVELLUS Hall. See *Chaunograptus novellus*.

Dendrograptus ontarioensis Bassler.

Dendrograptus ontarioensis Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 12, 13, pl. 1, fig. 4, fig. 12.

Niagaran dolomite: Hamilton, Ontario.

Dendrograptus phainotheca Gurley.

Dendrograptus phainotheca (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 11, 12, pl. 2, fig. 2; fig. 11.

Niagaran dolomite: Hamilton, Ontario.

Dendrograptus prægracilis Spencer.

Dendrograptus prægracilis Spencer, Canadian Nat., 10, 1882, p. 165 (nom. nud.); Trans. Acad. Sci. St. Louis, 4, 1884, p. 569, pl. 1, fig. 7; Bull. Mus. Univ. State Missouri, 1, 1884, p. 19, pl. 1, fig. 7.—Gurley, Jour. Geol., 4, 1896, pp. 95-308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 9, pl. 2, fig. 3, text figs. 4, 10.

Niagaran dolomite: Hamilton, Ontario.

Dendrograptus? problematicus (Spencer).

Inocaulis(?) problematica Spencer, Canadian Nat., n. s., 8, 1878, p. 458; *ibid.*, 10, 1882, p. 165; Bull. Mus. Univ. State Missouri, 1, 1884, pp. 14, 36, pl. 5, fig. 3; Trans. Acad. Sci. St. Louis, 4, 1884, p. 564, pl. 5, fig. 3.—Gurley, Jour. Geol., 4, 1896, pp. 99, 309.

Dendrograptus? problematicus Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 10, pl. 1, figs. 1, 2, text fig. 6.

Dendrograptus sp. Grant, Jour. Proc. Hamilton Assoc., 16, 1900, p. 102, fig.

Niagaran dolomite: Hamilton, Ontario.

Dendrograptus ramosus Spencer.

Dendrograptus ramosus Spencer, Canadian Nat., 10, 1882, p. 165 (nom. nud.); Trans. Acad. Sci. St. Louis, 4, 1884, p. 567, pl. 1, fig. 3; Bull. Mus. Univ. State Missouri, 1, 1884, pp. 14, 17, pl. 1, fig. 3, 3a.—Gurley, Jour. Geol., 4, 1896, pp. 95, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 8, pl. 1, fig. 3; text figs. 3, 9.

Niagaran dolomite: Hamilton, Ontario.

Dendrograptus rectus Ruedemann.

Dendrograptus rectus Ruedemann, Mem. New York State Mus., 11, 1908, p. 145, pl. 8, fig. 2, text fig. 51.

Upper Clinton: Clinton, Oneida County, New York.

Dendrograptus serpens Hopkinson.

Dendrograptus serpens Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 665, pl. 37, fig. 3.

Dendrograptus cf. *serpens* Gurley, Jour. Geol., 4, 1896, p. 84.

Canadian: Europe; Summit, Nevada.

DENDROGRAFTUS SIMPLEX Spencer. See *Dendrograptus dubius*.

DENDROGRAFTUS SIMPLEX Walcott. See *Mastigograptus simplex*.

Dendrograptus spinosus Spencer.

Dendrograptus spinosus Spencer, Canadian Nat., 10, 1882, p. 165 (nom. nud.); Trans. Acad. Sci. St. Louis, 4, p. 569, pl. 1, fig. 8; Bull. Mus. Univ. State Missouri, 1, pp. 14, 19, pl. 1, fig. 8.—Gurley, Jour. Geol., 4, 1896, pp. 95, 308.—Basler, Bull. U. S. Nat. Mus., 65, 1909, p. 10, fig. 5.

Niagaran dolomite: Hamilton, Ontario.

Dendrograptus striatus Hall.

Dendrograptus striatus Hall, Geol. Surv. Canada, dec. 2, 1865, p. 129, pl. 17, figs. 5-6.

Canadian (Levis, *Didymograptus dentatus* zone): Point Levis, Quebec.

Dendrograptus(?) succulentus Ruedemann.

Dendrograptus n. sp. Ruedemann, New York State Pal. Ann. Rep., 1902, p. 570.

Dendrograptus(?) succulentus Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 581-582, pl. 4, figs. 1-4, text figs. 16, 17.

Canadian: Deepkill, Rensselaer County, New York (*Deepkill*, *Diplograptus dentatus* zone); Point Levis, Quebec (*Levis*, *D. dentatus* zone).

DENDROGRAFTUS TENUIRAMOSUS Walcott. See *Mastigograptus tenuiramosus*.

Dendrograptus unilaterialis Gurley.

Dendrograptus unilaterialis Gurley, Jour. Geol., 4, 1896, p. 84.

Trenton (Magog): Magog, Quebec.

DEOCRINUS Hudson.

Genotype: *Rhodocrinus asperatus* Billings.

Deocrinus Hudson, Bull. New York State Mus., 107, 1907, p. 121.

Deocrinus asperatus (Billings).

Rhodocrinus asperatus Billings, Geol. Surv. Canada, dec. 4, 1859, p. 27, pl. 1, figs. 4a-4e.

Archæocrinus asperatus Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 301.

Deocrinus asperatus Hudson, Bull. New York State Mus., 107, 1907, p. 122, fig. 5, pl. 8.

Chazy (Aylmer): Near Montreal, Quebec.

DERMATOSTROMA Parks.

Genotype: *Stromatopora papillatum* James.

Dermatostroma Parks, Univ. Toronto Studies, Geol. Series, 7, 1910, p. 29.

Dermatostroma canaliculatum Parks.

Dermatostroma canaliculatum Parks, Univ. Toronto Studies, Geol. Series, 7, 1910, p. 35, pl. 24, figs. 8, 9.

Richmond (Waynesville): Waynesville, Ohio.

Holotype.—Cat. No. 40082, U.S.N.M.

***Dermatostroma cavernosum* Parks.**

Dermatostroma cavernosum Parks, Univ. Toronto Studies, Geol. Series, 7, 1910, p. 36, pl. 24, fig. 12-13.

Trenton (Catheys): Five miles east of Mount Pleasant, Tennessee.

Holotype.—Cat. No. 49508, U.S.N.M.

***Dermatostroma corrugatum* (Foerste).**

Labechia(?) *corrugata* Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 86, pl. 1, fig. 11.

Dermatostroma corrugatum Parks, Univ. Toronto Studies, Geol. Series, 7, 1910, p. 34, pl. 24, figs. 7, 10, 11, 14.

Richmond (Whitewater): Near Wilmington, Ohio.

***Dermatostroma glyptum* (Foerste).**

Labechia corrugata glypta Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 87.

Dermatostroma glyptum Parks, Univ. Toronto Studies, Geol. Series, 7, 1910, p. 33, pl. 24, figs. 4, 5, 6.

Richmond (Whitewater): Near Wilmington, Ohio.

***Dermatostroma papillatum* (James).**

Stromatopora papillata James, Paleontologist, 1, 1878, p. 1.—Mickleborough and Wetherby, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 81.—James, *ibid.*, 9, 1886, p. 251; *ibid.*, 15, 1892, p. 91.

Dermatostroma papillatum Parks, Univ. Toronto Studies, Geol. Series, 7, 1910, p. 30, pl. 23, figs. 8-10.

Maysville and Richmond: Cincinnati, Ohio, and vicinity; Indiana; Kentucky Tennessee; Virginia.

***Dermatostroma papillatum diversum* Parks.**

Dermatostroma papillatum diversum Parks, Univ. Toronto Studies, Geol. Series, 7, 1910, p. 31, pl. 23, fig. 12.

Maysville (Corryville): Cincinnati, Ohio.

Holotype.—Cat. No. 56844, U.S.N.M.

***Dermatostroma scabrum* (James).**

Stromatopora scabra James, Paleontologist, 3, 1879, p. 18.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 251; *ibid.*, 1892, p. 91.

Labechia scabra Harper and Bassler, Cat. Fossils, Trenton and Cincinnati Periods Vicinity Cincinnati, 1896, p. 3.

Dermatostroma scabrum Parks, Univ. Toronto Studies, Geol. Series, 7, 1910, p. 31, pl. 24, figs. 1-3.

Eden-Richmond: Lebanon, Cincinnati, etc., Ohio; Indiana; Kentucky; Tennessee.

Plesiotype.—Cat. No. 40080, U.S.N.M.

***Dermatostroma tyronense* Foerste.**

Dermatostroma tyronensis Foerste, Bull. Sci. Lab. Denison Univ., 17, 1912, p. 139, pl. 10, figs. 5a, b.

Black River (Lowville): High Bridge, Kentucky.

DESMOGRAPTUS Hopkinson.

Genotype: *D. cancellatus* Hopkinson.

Desmograptus Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 663.—

Poeta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 185.—Ruedemann, Mem.

New York State Mus., 7, pt. 1, 1904, p. 609.—Grabau and Shimer, N. A.

Index Fossils, 1, 1906, p. 26.—Ruedemann, Zittel-Eastman Textb. Pal., 1913, p. 128.

Desmograptus cancellatus (Hopkinson).

Dictyograptus (*Desmograptus*) *cancellatus* Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 668, pl. 36, figs. 11a, 11b.

Dictyonema (*Desmograptus*) *cancellatum* Ruedemann, New York State Pal., Ann. Rep. 1902, p. 570.

Desmograptus cancellatus Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 610, 611, pl. 3, figs. 5-8, 31.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 26, fig. 36.

Desmograptus macrodictyum Gurley, Jour. Geol., 4, 1896, p. 83.

Lower Ordovician: St. Davids, Wales (Lower Arenig); Point Levis, Quebec (Levis); Deepkill, Rensselaer County, New York (Deepkill, *Diplograptus dentatus* zone).

Desmograptus intricatus Ruedemann.

Dictyonema (*Desmograptus*) n. sp. Ruedemann, New York State Pal., Ann. Rep. 1902, p. 570.

Desmograptus intricatus Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 611, 612, pl. 3, figs. 1-4, text figs. 32, 33; fig. 30, p. 609.

Canadian (Deepkill-*Diplograptus dentatus* zone): Deepkill, Rensselaer County, New York.

DESMOGRAPTUS MACRODICTYUM Gurley. See *Desmograptus cancellatus*.

Desmograptus pergracilis (Hall and Whitfield).

Dictyonema pergracilis Hall and Whitfield, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 181 (abstract, p. 1); 27th Rep. New York State Cab. Nat. Hist., 1875, pl. 9, fig. 38.—Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, pp. 564, 577; Bull. Mus. Univ. State Missouri, 1, 1884, p. 27.—Foerste, Bull. Sci. Lab. Denison Univ., 2, pt. 1, 1887, p. 107.—Pocta, Syst. Sil. Boheme, 8, pt. 1, 1894, p. 193.—Gurley, Jour. Geol., 4, 1896, p. 308.

Desmograptus pergracilis Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 179.

Niagaran (Louisville): Louisville, Kentucky.

Desmograptus tenuiramosus Ruedemann.

Desmograptus tenuiramosus Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 177, 178, pl. 1, fig. 2, text figs. 84, 85.

Chazy (Normanskill): Glenmont, Albany County, New York.

DIABOLOCRINUS Wachsmuth and Springer.

Genotype: *D. perplexus* Wachsmuth and Springer.

Diabolocrinus Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, pp. 211, 249.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 200.—Zittel, Grundzuge Pal., 1, 1910, p. 161.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 188.

Diabolocrinus asperatus (Miller and Gurley).

Archæocrinus asperatus Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 19, pl. 2, figs. 7-9.—Miller, Sec. App., N. A. Geol. Pal., 1897, p. 734, figs. 1296, 1297.

Diabolocrinus hieroglyphicus Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 252 pl. 10, fig. 5a-c.

Chazy (Ottoese): Near Knoxville, Tennessee.

DIABOLOCRINUS HIEROGLYPHICUS Wachsmuth and Springer. See *Diabolocrinus asperatus*.

Diabolocrinus perplexus Wachsmuth and Springer.

Diabolocrinus perplexus Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 250, pl. 11, fig. 1a, b.

Chazy (Ottosee): Near Knoxville, Tennessee.

Diabolocrinus vesperalis (White).

Rhodocrinus vesperalis White, Proc. U. S. Nat. Mus., 2, 1880, p. 259, pl. 1, figs. 11, 12; 12th Ann. Rep. U. S. Geol. Surv. Terr., 1883, p. 129, pl. 35, figs. 4a, b.

Diabolocrinus vesperalis Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, pp. 251, 262, pl. 11, figs. 1c-, d.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 104.

Gilbertocrinites americanus Troost, Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 61 (nom. nud.).

Lyriocrinus sculptilis Miller (not Hall, 1851), Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 83, pl. 3, figs. 6a, b; p. 117 (corrected to *L. sculptus* on private edition).

Archæocrinus sculptus Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1885, p. 320 (Rev. Pal., pt. 3, sec. 1, 1885, p. 98).—Miller, N. A. Geol. Pal., 1889, p. 225, fig. 250.

Chazy (Ottosee): Near Knoxville, Tennessee: Erroneously cited by White (1880) from the Coal Measures near Humboldt, Kansas, and by Miller (1882) from the Helderbergian of Tennessee.

Holotype and *plesiotype*.—Cat. Nos. 39970, 80321, U.S.N.M.

DIAGONIELLA Rauff. See *Protospongia* Salter.

DIAMESOPORA Ulrich (part). See *Cœloclema* Ulrich.

DIAMESOPORA Hall.

Genotype: *D. dichotoma* Hall.

Diamesopora Hall, Pal. New York, 2, 1852, p. 158 (not defined).—Pictet, *Traité de Pal.*, 2d ed., 4, 1857, p. 170.—Hall and Simpson, Pal. New York, 6, pp. 15, 19.—Miller, N. A. Geol. Pal., 1889, p. 300.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 566.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 54, 229.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 175; Bull. New York State Mus., 45, 1901, p. 175.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 62.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 165.

Diamesopora communis Ulrich. See *Cœloclema commune*.

Diamesopora dichotoma Hall.

Diamesopora dichotoma Hall, Pal. New York, 2, 1852, p. 158, pl. 40, figs. 3a-d.—Rominger, Proc. Acad. Nat. Sci. Philadelphia, 1866, p. 118.—Grabau, Bull. New York State Mus. 45, 1901, p. 175, fig. 78; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 175, fig. 78.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 62, pl. 21, figs. 12, 13; pl. 24, figs. 28-30.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 166, fig. 216a, b.

Clinton (Rochester): Lockport, Rochester, etc., New York; Hamilton and Grimsby, Ontario.

Plesiotype.—Cat. No. 35759, U.S.N.M.

Diamesopora infrequens (Hall).

Trematopora infrequens Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 10, figs. 13, 14 (in error for 3, 4); *ibid.*, Mus. ed., 1879, p. 111, pl. 10, fig. 3 (in part), 4; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 232, pl. 9, figs. 3 (in part), 4.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890 p. 1200, figs.

Cœloclema infrequens Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 258.

Diamesopora infrequens Ulrich, Geol. Surv. Illinois, 8, 1890, p. 467.

Niagan (Waldron): Waldron, etc., Indiana; Newsom, Tennessee.

Diamesopora osculum (Hall).

- Trematopora osculum* Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 10, figs. 3-12 (3 and 4 in error); *ibid.*, Mus. ed., 1879, p. 110, pl. 10, figs. 5-8, 11-14; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 231, pl. 9, figs. 5-8, 11-14.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1201, fig. 5.
Cœloclema osculum Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 258.
Diamesopora osculum Ulrich, Geol. Surv. Illinois, 8, 1890, p. 467.
 Niagaran (Waldron): Waldron, etc., Indiana; Newsom, Tennessee.

DIAMESOPORA OWENI Ulrich. See *Cœloclema oweni*.

Diamesopora subimbricata (Hall).

- Trematopora subimbricata* Hall, 28th Ann. Rep. New York State Mus., Mus. ed., 1879, pl. 10, figs. 9, 10; Trans. Albany Inst., 10, 1883, p. 60 (abstract, 1879, p. 4); 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 234, pl. 9, figs. 9, 10.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1202, figs. 5.
Cœloclema imbricata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1882, p. 258.
Diamesopora subimbricata Ulrich, Geol. Surv. Illinois, 8, 1890, p. 467.
 Niagaran (Waldron): Waldron, Indiana.

DIAMESOPORA TRENTONENSIS Ulrich. See *Cœloclema trentonense*.

Diamesopora? tubulosa (Hall).

- Trematopora tubulosa* Hall, Pal. New York, 2, 1852, p. 151, pl. 40A, figs. 3a-c.
Diamspora tubulosa Rominger, Proc. Acad. Nat. Sci. Philadelphia, 1866, p. 119.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 467.
 Lower Clinton: Wayne County, New York.

DIAMESOPORA VARIA Ulrich. See *Chilotrypa varia*.

DIAMESOPORA VAUFELI Ulrich. See *Cœloclema alternatum*.

DIANULITES Eichwald.

Genotype: *D. bicornis* Eichwald.

- Dianulites* Eichwald, Zool. Spec., 1, 1829, p. 180; Leth. Rossica, 1, 1860, p. 487.—Dybowski, Die Chaetiden der Ostbaltischen Silur-form., 1877, p. 14.—Zittel, Handb. Pal., 1, 1880, p. 616.—Nicholson, Genus Monticulipora, 1881, pp. 20, 155.—Waagen and Wentzel, Pal. Indica, 13th ser., 1886, p. 874.—Simpson, 14th Ann. Rep. State Geol. New York for the year 1894, 1897, p. 587.—Miller, N. A. Geol. Pal., 2d App. 1897, p. 728.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 230.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 226-229; Zittel-Eastman Textb. Pal., 1913, p. 335.
Hexaporites Pander, Beitr. zur Geogn. d. russ. Reichs., 1830, p. 106, pl. 1, fig. 5; pl. 28, fig. 8.

DIANULITES DISCOIDEA Miller. See *Mesotrypa discoidea*.

DIANULITES DUBIA Miller. See *Diplotrypa? dubia*.

DIANULITES LIMITARIS Miller. See *Diplotrypa limitaris*.

DIANULITES NEGLECTA Miller. See *Diplotrypa neglecta*.

DIANULITES PATELLA Miller. See *Mesotrypa patella*.

Dianulites petropollitanus Dybowski.

- Dianulites petropollitana* Dybowski, Die Chaetiden der Ostbaltischen Silur-form., 1877, p. 24, pl. 1, figs. 4, 5.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 232-237, pl. 2, figs. 4-6a; pl. 10, figs. 7-11; text figs. 129-132.
Hexaporites Pander, Beitr. Geogn. russ. Reichs., 1830, p. 106, pl. 1, fig. 5; pl. 28, fig. 8.

Dianulites petropollitanus—Continued.

Hexaporites fungiformis Leuchtenberg in Eichwald Geog. Russ., 1846, p. 370.—Eichwald, Leth. Rossica, 1, 1860, p. 478.

Dianulites petropollitanus var. *hexaporites* Dybowski, Die Chaetetiden der Ostbaltischen Silurform., 1877, p. 30, pl. 1, figs. 6, 6a.

Monotrypa (*Chaetetes*?) *cumulata* Ulrich, Geol. Minnesota, 3, pt. 1, 1893, p. 307, pl. 27, figs. 26, 27.

Middle Ordovician: Esthonia, Russia; Goodhue County, Minnesota (Prosser); Ottawa, Ontario.

Plesiotypes.—Cat. Nos. 26906, 57339, 57340, U.S.N.M. (Holotype of *M. cumulata*).

DIANULITES PETROPOLLITANUS var. **HEXAPORITES** Dybowski. See *Dianulites petropollitanus*.

DIANULITES QUEBECENSIS Miller. See *Mesotrypa quebecensis*.

DIANULITES ROTUNDA Miller. See *Mesotrypa rotunda*.

DIANULITES SELKIRKENSIS Miller. See *Mesotrypa selkirkensis*.

DIAPHOROSTOMA Fischer. Genotype: *Platystoma ventricosum* Conrad.

Platystoma Conrad (not Meigen, 1903), Jour. Acad. Nat. Sci. Philadelphia, 7, 1842, p. 275.—Hall, Pal. New York, 2, 1852, pp. 103, 286; *ibid.*, 3, 1859, pp. 293, 299.—Nicholson, Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 117.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th ser., 1, 1880, p. 103.—Lindström, Kongl. Sven. Vet.-Akad. Handl., 19, No. 6, 1881, p. 61.—Zittel, Handb. Pal., 2, 1882, p. 217.—Koken, Neues Jahrb. Min., Geol., 6, 1889, pp. 349, 468, 470.—Miller, N. A. Geol. Pal., 1889, p. 418.—Nettelroth, Kentucky, Foss. Shells, Geol. Surv. Kentucky, 1889, p. 183.—Koken, Die Leitfossilien, Leipzig, 1896, p. 128.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 274.

Diaphorostoma Fischer, Man. Conch., 1885.—Grabau, Bull. New York State Mus., 45, 1, 1901, p. 211; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 211.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 679.—Dall, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 54.

Diaphorostoma auriforme (Hall).

Capulus auriformis Hall, Pal. New York, 1, 1847, p. 31, pl. 6, figs. 9a, b; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 67.

Stomatia auriformis Emmons, Amer. Geology, 1, pt. 2, 1855, p. 157.

Platystoma auriforme Raymond, Ann. Carnegie Mus., 4, 1908, p. 217.

Chazyan or Trenton: Galway, New York.

Diaphorostoma brownsportense (Foerste).

Platyceras brownsportensis Foerste, Jour. Geol., 11, 1903, p. 709.

Diaphorostoma brownsportensis Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 64, pl. 1, fig. 14.

Niagaran (Brownsport): Brownsport Furnace, Cerro Gordo, and Bath Springs, Tennessee.

Diaphorostoma campanulatum (Winchell and Marcy).

Platyceras campanulatum Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 99, pl. 2, fig. 16.

Niagaran (Racine): Chicago, Illinois.

Diaphorostoma cliftonense Foerste.

Diaphorostoma cliftonensis Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 63, pl. 3, figs. 41A, B; Cincinnati Soc. Nat. Hist. Jour., 21, 1909, p. 30.

Clinton: Clifton, Tennessee (Osgood); Martins, Lewis County, Kentucky (West Union).

Diaphorostoma hemisphericum (Hall).

Euomphalus hemisphericus Hall, Nat. Hist. New York, Geol., 4, 1843, p. 109, figs. 1, 2; p. 110, tab. 16, figs. 1, 2.

Straparollus hemisphericus D'Orbigny, Prodr. Pal., 1, 1849, p. 29 (gen. ref.)

Platystoma hemispherica Hall, Pal. New York, 2, 1852, p. 288, pl. 60, fig. 2a, b.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 692, figs.

Clinton (Rochester): Rochester, Lockport, etc., New York.

Diaphorostoma humile (Billings).

Cyclonema humilis Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1886, p. 56.

Gamachian (Ellis Bay) and Anticostian (Gun River-Chicotte): The Jumpers, etc., Anticosti.

Diaphorostoma illinoisense Savage.

Diaphorostoma illinoisensis Savage, Bull. Geol. Surv., Illinois, 23, 1913, p. 118, pl. 7, fig. 19.

Upper Medinan (Channahon): Will County, Illinois.

Diaphorostoma niagarensis (Hall).

Platystoma niagarensis Hall, Pal. New York, 2, 1852, p. 287, pl. 60, figs. 1a-v.—Roemer, Sil. Fauna West. Tennessee, Breslau, 1860, p. 75, pl. 5, fig. 15.—Hall, Trans. Albany Inst., 4, 1863, p. 227 (loc. occ.); 20th Rep. New York State Cab. Hist., 1868, p. 342, 393 (loc. occ.) (Extras, 1865), rev. ed., 1870, pp. 390, 432; 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 23, figs. 1-12; pl. 29, figs. 1-15; pl. 31, fig. 3; Mus. ed., 1879, p. 175, pl. 28, figs. 1-12; pl. 29, figs. 1-15.—White, 2d Ann. Rep. Indiana Dep. Stat. Geol., 1880, p. 497, pl. 3, figs. 7, 8.—Zittel, Handb. Pal., 2, 1882, p. 217, fig. 297.—Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1881, p. 318, pl. 29, figs. 1-12; 137, pl. 30, figs. 1-15.—Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 97, pl. 13, figs. 3a, b; fig. 22.—Nettelroth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 185, pl. 33, fig. 30.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 693, figs.—Miller, N. A. Geol. Pal., 1889, p. 418, fig. 697.—Rowley in Greene, Cont. Indiana Pal., pt. 8, 1901, p. 67, pl. 23, fig. 12.—Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 483, pl. 57, figs. 3, 4.

Platystoma (*Diaphorostoma*) *niagarensis* Grabau, Amer. Nat., 36, 1902, p. 939.

Diaphorostoma niagarensis Grabau, Bull. Buffalo Soc. Nat. Sci., 8, 1901, p. 212, fig. 141; Bull. New York State Mus., 45, 1901, p. 212, fig. 141.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 59, pl. 10, figs. 14-16.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 679, fig. 951.—Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 102, pl. 6, fig. 1.

Platyceras (*Platystoma*) *niagarensis* Foerste, Geol. Surv. Ohio, 7, 1893, p. 553, pl. 25, figs. 3, 22.

Platyceras (*Diaphorostoma*) *cornutum* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 453, pl. 13, figs. 9-16.

Strophostylus niagarensis Keyes, Amer. Nat., 24, 1890, pl. 33, fig. 2; Proc. Iowa Acad. Sci., 1, pt. 2, 1892, p. 25.

Silurian: Lockport, Rochester, etc., New York. As at present identified a widely distributed species in North America ranging from the Brassfield to the Keyser formation of the Helderbergian.

Pleriotypic.—Cat. No. 53232, U.S.N.M. (Nettelroth).

Observation.—*D. niagarensis* Hall has been identified with *Platyceras cornutum* Hisinger, but until the two have been more closely compared it is preferred to leave them distinct.

***Diaphorostoma niagarense clintonense* (Foerste).**

Platyceras Niagarense var. *Clintonense* Foerste, Geol. Surv. Ohio, Pal., 7, 1903, p. 554, pl. 37a, fig. 8.

Clinton: Mifflintown, Juniata County, Pennsylvania.

***Diaphorostoma niagarense immaturum* Savage.**

Diaphorostoma niagarensis var. *immatura* Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 55, pl. 2, fig. 3.

Upper Medinan (Girardeau): Near Thebes, Illinois.

***Diaphorostoma niagarense multilineatum* (Calvin).**

Platystoma niagarense var. *multilineatum* Calvin, Bull. Lab. Nat. Hist. State Univ. Iowa, 1, 1890, p. 177, pl. 2, figs. 4a-c.

Niagaran (Waldron): Waldron, Indiana.

***Diaphorostoma perforatum* Whiteaves.**

Diaphorostoma perforatum Whiteaves, Geol. Surv. Canada, Ann. Rep., n. s., 14, App. F, 1904, p. 52; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 261, pl. 29, figs. 7, 7a.

Niagaran: Ekwan River, Canada.

***Diaphorostoma plebium* (Hall).**

Platystoma plebia Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, pl. 28, figs. 14, 15; rev. ed., 1879, p. 175, pl. 28, figs. 14, 15; 11th Ann. Rep. Dep. Geol. Nat. Hist., 1882, p. 319, pl. 29, figs. 14, 15.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 695, figs.

Niagaran (Waldron): Waldron, Indiana.

***Diaphorostoma trigonostoma* (Meek).**

Platystoma? trigonostoma Meek, Proc. Acad. Nat. Sci. Philadelphia, 1, 1871, 169.—Miller, N. A. Geol. Pal., 1889, p. 418, fig. 698.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 695, figs.

Platystoma Niagarensis var. *trigonostoma* Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 185, pl. 16, figs. 3a-c, and text fig.

Xenophora trigonostoma Whitfield, Geol. Wisconsin, 4, 1882, p. 358 (gen. ref.). Niagaran: Yellow Springs, Ohio.

DIASTOPORA D'Orbigny (part). See *Berenicea Lamouroux*.

DIASTOPORELLA Vine. See *Berenicea Lamouroux*.

DIASTOPORINA Ulrich.

Genotype: *D. flabellata* Ulrich.

Diastoporina Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 177.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 684.—Ulrich, Geol. Minnesota, 3, 1893, p. 121.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 17.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 595.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 20.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 119.

***Diastoporina flabellata* Ulrich.**

Diastoporina flabellata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 178, fig. 5; Geol. Minnesota, 3, 1893, p. 122, pl. 2, figs. 2, 3.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, figs. 199, 200 (p. 595).—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 120, fig. 178f.

Trenton (Prosser): Cannon Falls and St. Paul, Minnesota.

Holotype.—Cat. No. 43266, U.S.N.M.

DICELLOCEPHALUS AFFINIS Matthew. See *Platycolpus affinis*.

DICELLOCEPHALUS BARABUENSIS Whitfield. See *Platycolpus barabuensis*.

DICELLOCEPHALUS BELLI Matthew. See *Anomocarella belli*.

DICELLOCEPHALUS(?) CORAX Matthew. See *Dikelocephalus(?) corax*.

DICELLOCEPHALUS CRISTATUS Matthew. See *Conokephalina? cristatus*.

DICELLOCEPHALUS FINALIS Walcott. See *Apatokephalus finalis*.

DICELLOCEPHALUS HARTII Lesley. See *Dikelocephalus hartii*.

DICELLOCEPHALUS INEXPECTANS Walcott. See *Conokephalina inexpectans*.

DICELLOCEPHALUS MAGNIFICUS Matthew. See *Hungaia magnifica*.

DICELLOCEPHALUS MEGALOPS Matthew. See *Conokephalina megalops*.

DICELLOCEPHALUS OWENI Matthew. See *Anomocarella? oweni*.

DICELLOCEPHALUS PAUPER Matthew. See *Ptychaspis? pauper*.

DICELLOCEPHALUS PLANIFRONS Matthew. See *Anomocarella? planifrons*.

DICELLOCEPHALUS SESOSTRIS Matthew. See *Ptychaspis sesostris*.

DICELLOCEPHALUS TRIBULIS Walcott. See *Dikelocephalus tribulis*.

DICELLOGRAPTUS Hopkinson. See *Dicellograptus* Hopkinson.

DICELLOGRAPTUS Hopkinson. Genotype: *Didymograptus elegans* Carruthers.
Dicellograptus Hopkinson, *Geol. Mag.*, 8, 1871, p. 20.

Dicellograptus Zittel, *Handb. Pal.*, 1, 1879, p. 300.—Tullberg, *Sveriges Geol. Unders.*, Ser. C, No. 55, 1883, pp. 12, 14.—Herrman, *Geol. Mag.*, dec. 3, 2, 1885, p. 451.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 329.—Wiman, *Bull. Geol. Inst. Univ. Upsala*, 2, pt. 2, 1896, p. 264.—Walther, *Zeits. d. d. geol. Gesell.*, 49, 1897, p. 256.—Roemer and Frech, *Leth. geog.*, *Leth. Pal.*, 1, 3 Lief, 1897, p. 617.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1906, p. 32.—Ruedemann, *Mem. New York State Mus.*, 11, pt. 2, 1908, pp. 291-293; Zittel-Eastman *Textb. Pal.*, 2d ed., 1913, p. 130.

Dicellograptus complanatus Lapworth.

Dicellograptus complanatus Lapworth, *Ann. Mag. Nat. Hist.*, 5th ser., 5, 1880, p. 160, pl. 5, figs. 17a-e.—Tullberg, *Sver. Geol. Unders.*, *Afh. och Upps.*, Ser. C, 50, 1882, p. 18.—Roemer and Frech, *Leth. Pal.*, 1, 1897, p. 618, fig. 183.—Elles and Wood, *Mon. British Grapt.*, 1904, p. 139, pl. 20, figs. 1ad.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1906, p. 32, figs. 53a, b.—Ruedemann, *Mem. New York State Mus.*, 11, pt. 2, 1908, pp. 294, 295.

Ordovician: Scotland and Ireland (Upper Hartfell); Scania (*Trinucleus* beds); Arbuckle Mountains, Oklahoma (Sylvan).

Plesiotype.—Cat. No. 54267, U.S.N.M.

Dicellograptus divaricatus (Hall).

Graptolithus divaricatus Hall, *Pal. New York*, 3, 1859, p. 514, figs. 1-4; *New York State Cab. Nat. Hist.*, 13th Ann. Rep., 1860, p. 58, figs. 1-4; *Geol. Surv. Canada, Can. Org. Rem.*, dec. 2, 1865, p. 14, fig. 19.—Lesley, *Geol. Surv. Pennsylvania, Rep. P 4*, 1889, p. 264, figs.

Graptolithus (Dicranograptus) divaricatus Hall, *New York State Cab. Nat. Hist.*, 20th Ann. Rep., 1868, p. 180, fig. 20; rev. ed., 1870, p. 212, fig. 20.

Dicellograptus divaricatus—Continued.

Didymograptus divaricatus Nicholson, *Ann. Mag. Nat. Hist.*, 5, 1868, p. 351, pl. 7, fig. 4; *Mon. British Grapt.*, 1872, p. 55, text fig. 30.

Dicellograptus divaricatus Hopkinson, *Geol. Mag.*, 8, 1871, p. 25, pl. 1, fig. 4.—Hopkinson and Lapworth, *Quart. Jour. Geol. Soc.*, 31, 1875, p. 654, pl. 34, figs. 3a, b.—Lapworth, *Roy. Soc. Can. Proc. and Trans.*, 5, sec. 4, 1886, p. 184.—Walcott, *Geol. Soc. Am. Bull.*, 1, 1890, p. 339.—T. S. Hall, *Rec. Geol. Surv. N. S. Wales*, 7, pt. 2, 1902, p. 3, pl. 12, fig. 3; pl. 13, fig. 3.—Elles and Wood, *Mon. British Grapt.*, pt. 4, 1904, p. 143, pl. 20, figs. 5a, 5b.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1906, p. 32, fig. 53c.—Ruedemann, *Mem. New York State Mus.*, 11, pt. 2, 1908, pp. 296–299, pl. 18, figs. 4, 212–214.

Dicellograptus moffatensis var. *divaricatus* Lapworth, *Belfast Nat. Field Club. Rep. and Proc.*, 1, pt. 4, 1877; app., p. 141, pl. 7, fig. 10.—Ami, *Can. Geol. Surv.*, *Ann. Rep.* 3, pt. 2, 1889, p. 60K, 116K.

Dicranograptus divaricatus Walcott, *Alb. Inst. Trans.*, 10, 1883, (adv. sheets, 1879, p. 34).

Dicranograptus (*Dicellograptus*) *divaricatus* Roemer and Frech, *Leth. Pal.*, 1, 3 Lief, p. 618.

Chazyan (Normanskill): Kenwood, Glenmont, Stockport, etc., New York; Nevada; Canada; Arkansas.

Middle Ordovician: Scotland and Wales (Glenkiln); New South Wales; Australia.

Dicellograptus divaricatus bicurvatus Ruedemann.

Dicellograptus elegans Gurley, *Geol. Surv. Arkansas, Ann. Rep. for 1890*, 3, 1892, p. 414; *Jour. Geol.*, 4, 1896, pp. 71, 95.

Dicellograptus divaricatus var. *bicurvatus* Ruedemann, *Mem. New York State Mus.*, 11, pt. 2, 1908, p. 300, pl. 18, fig. 8, text fig. 216.

Chazyan (Normanskill): Kenwood and Glenwood, New York; Ouachita Mountains, Oklahoma (Talihina); Arkansas (Stringtown).

Observation.—The species listed by Gurley as *D. elegans* Carruthers in all probability refers to this variety. See Ruedemann, *Mem. New York State Mus.*, 11, pt. 2, 1908, p. 312.

DICELLOGRAPTUS DIVARICATUS Lapworth (1876). See *Dicellograptus divaricatus rigidus*.

Dicellograptus divaricatus rectus Ruedemann.

Dicellograptus divaricatus var. *rectus* Ruedemann, *Bull. New York State Mus.*, 11, pt. 2, 1908, p. 299, pl. 18, fig. 7, text fig. 215.

Chazyan (Normanskill): Kenwood and Speigletown, New York.

Dicellograptus divaricatus rigidus Lapworth.

Dicellograptus divaricatus Lapworth, *Cat. West. Scott. Foss.*, 1876, pl. 4, fig. 86.

Dicellograptus moffatensis var. *divaricatus* Lapworth, *Belfast Nat. Field Club. Rep. and Proc.*, 1, pt. 4, app. 1877, p. 141, pl. 7, fig. 10.

Dicellograptus rigidus Gurley, *Geol. Surv. Arkansas*, 3d *Ann. Rep.*, 1890, p. 416; *Jour. Geol.*, 4, 1896, p. 297.

Dicellograptus divaricatus var. *rigidus* Lapworth, *Ann. Mag. Nat. Hist.*, 5th ser., 5, 1880, p. 163, pl. 5, fig. 20.—Elles and Wood, *Mon. British Grapt.*, 1904, p. 144, fig. 88a; pl. 20, figs. 6a–e.—Ruedemann, *Mem. New York State Mus.*, 11, pt. 2, 1908, p. 301.

Ordovician: Great Britain (Glenkiln); Arkansas and Oklahoma (Normanskill-Stringtown).

Pteriotype.—Cat. No. 54259, U.S.N.M.

***Dicellograptus divaricatus salopiensis* Elles and Wood.**

Dicellograptus divaricatus var. *salopiensis* Elles and Wood, Mon. British Grapt., pt. 4, 1904, p. 145, pl. 20, figs. 7a-e.—Ruedemann, Bull. New York State Mus., 11, pt. 2, 1908, p. 300, pl. 18, fig. 5, text figs. 217-219.

Ordovician: Shropshire, England, and South Scotland (Glenkiln); Stockport and Kenwood, New York (Normanskill).

***DICELLOGRAPTUS ELEGANS* Gurley.** See *Dicellograptus divaricatus bicurvatus*.

***Dicellograptus gurleyi* Lapworth.**

Dicellograptus gurleyi (Lapworth MSS) Gurley, Jour. Geol., 4, 1896, p. 70.—Ruedemann, Bull. New York State Mus., 11, pt. 2, 1908, pp. 303-306, pl. 19, figs. 7-9, text figs. 223-228.

Chazyan (Normanskill): Stockport, Glenmont, and Mount Moreno, New York; Arkansas (Stringtown).

Plesiotype.—Cat. No. 54265, U.S.N.M.

***Dicellograptus intortus* Lapworth.**

Dicellograptus intortus Lapworth, Ann. and Mag. Nat. Hist., 5th ser., 5, 1880, p. 161, pl. 5, fig. 19a.—Clark, Geol. Mag., 4th ser., 9, 1902, p. 498.—Elles and Wood, Mon. British Grapt., pt. 4, 1904, p. 146, figs. 80a, b, pl. 20, figs. a-f.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 302, 303, figs. 221, 222; pl. 18, figs. 9-10.

Dicellograptus intortus Gurley, Jour. Geol., 4, 1896, p. 95.

Dicellograptus intortus polythecatus Gurley, Jour. Geol., 4, 1896, p. 70.

Ordovician: Great Britain (Glenkiln); Stockport and Speigletown, New York; Arkansas (Normanskill).

***DICELLOGRAPTUS INTORTUS POLYTHECATUS* Gurley.** See *Dicellograptus intortus*.

***Dicellograptus mensurans* Ruedemann.**

Dicellograptus mensurans Ruedemann, Mem. New York State Mus., 11, 1908, pt. 2, pp. 295, 296, pl. 18, fig. 2, text figs. 210, 211.

Chazyan: Kenwood, New York (Normanskill); Alabama (Athens).

***Dicellograptus moffatensis alabamensis* Ruedemann.**

Dicellograptus moffatensis var. *alabamensis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 310-312, pl. 20, figs. 1, 2, text figs. 234-236.

Chazyan (Athens): Near Pratt's Ferry, Bibb County, Alabama.

***DICELLOGRAPTUS MOFFATENSIS* var. *DIVARICATUS* Ami.** See *Dicellograptus divaricatus*.

***DICELLOGRAPTUS MOFFATENSIS* var. *DIVARICATUS* Lapworth.** See *Dicellograptus divaricatus rigidus*.

***DICELLOGRAPTUS RIGIDUS* Gurley.** See *Dicellograptus divaricatus rigidus*.

***Dicellograptus sextans* (Hall).**

Graptolithus sextans Hall, Pal. New York, 1, 1847, p. 273, pl. 74, fig. 3.—Salter, Quar. Jour. Geol. Soc., 5, 1849, p. 17, pl. 1, fig. 10.—Chapman, Canadian Jour., n. s., 1, 1856, p. 389, fig. 2.—Carruthers, Siluria, 4th ed., 1867, p. 61, fig. 8.—Hall, 20th Rep. New York State Cab. Hist., 1868, pp. 180, 227; rev. ed., 1870, pp. 212, 224.—Nicholson, Quar. Jour. Geol. Soc., 24, 1868, p. 134.

Diplograptus? *sextans* McCoy, British Pal. Foss., 1855, p. 9.

Didymograptus sextans Nicholson, Ann. Mag. Nat. Hist., 4th ser., 5, 1870, p. 354, pl. 9, fig. 9.

Dicellograptus sextans—Continued.

Dicellograptus sextans Lapworth, Belfast Nat. Field Club, Rep. and Proc., 1, pt. 4, 1877, pl. 7, fig. 4.—Linnarsson, Sver. Geol. Unders., ser. C, no. 31, 1879, p. 18.—Lapworth, Ann. and Mag. Nat. Hist., 5th ser., 6, 1880, p. 19; Trans. Roy. Soc. Canada, 5, sec. 4, 1886, p. 178.—Ami, Canadian Geol. Surv. Rep., 2d ser., 3, pt. 2, 1889, p. 117.—Walcott, Geol. Soc. Amer. Bull., 1, 1890, p. 339.—Gurley, Jour. Geol., 4, 1896, p. 297.—T. S. Hall, Roy. Soc. Victoria Proc., 9, 1896, p. 184; Geol. Mag., n. s., dec. 4, 6, 1899, p. 445.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 539.—Clark, Geol. Mag., 4th ser., 9, 1902, p. 498.—Elles and Wood, Mon. British Grapt., pt. 4, 1904, p. 153, pl. 21, figs. 1a-e.—Dale, Bull. U. S. Geol. Surv., 242, 1904, p. 33.—Ami, Geol. Surv. Canada, Sum. Rep., 1905, p. 12.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 33, fig. 53d, e.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 306-308, pl. 19, fig. 1, text figs. 229-230.

Dicellograptus cf. sextans Tullberg, Sver. Geol. Unders., ser. C, No. 50, 1882, p. 20.

Dicranograptus sextans Hopkinson, Geol. Mag., 7, 1870, p. 356, pl. 16, fig. 1.—Lapworth, Cat. West. Scott. Foss., 1876, p. 6, pl. 3, fig. 78.—Walcott, Trans. Albany Inst., 10, 1883, p. 34 (adv. sheets, 1879).—Richardson, Terranes of Orange County, Vermont, 1902, p. 63.

Dicranograptus (Dicellograptus) sextans Roemer and Frech, Leth. Pal., 1, 1897, p. 621.

Dicranograptus formosus Hopkinson, Geol. Mag., 7, 1870, p. 356.

Middle Ordovician: Glenmont, Mt. Moreno, etc., New York; Vermont; Arkansas (Normanskill); England; Wales; Scotland; Ireland; Sweden; and Australia.

Dicellograptus sextans exilis Elles and Wood.

Dicellograptus sextans var. *exilis*, Elles and Wood, Mon. British Grapt., pt. 4, 1904, p. 153.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 309, 310, fig. 231.

Graptolithus sextans (pars.) Hall, Pal. New York, 1, 1847, pl. 74, fig. 3a.

Middle Ordovician: Great Britain (Glenkiln); Glenmont and Mt. Moreno, New York (Normanskill).

Dicellograptus sextans perexilis Ruedemann.

Dicellograptus sextans var. *perexilis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 310, pl. 19, fig. 2, text fig. 233.

Chazyan (Normanskill): Mt. Moreno, near Hudson, New York.

Dicellograptus sextans tortus Ruedemann.

Dicellograptus sextans var. *tortus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 309, fig. 232.

Chazyan (Normanskill): Kenwood, New York.

Dicellograptus smithi Ruedemann.

Dicellograptus smithi Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 313-315, pl. 19, figs. 3-6, text figs. 237, 238.

Chazyan (Athens): Near Pratt's Ferry, Bibb County, Alabama.

DICELLOGRAPTUS TENUIS Lapworth. See *Didymograptus subtenuis*.**DICELLOMUS** Hall.

Genotype: *Lingula polita* Hall.

Dicellomus Hall, 23d Ann. Rep. New York State Cab. Nat. Hist., 1873, p. 246.—Walcott, Mon. U. S. Geol. Surv., 1889, 32, pt. 2, p. 446; Proc. U. S. Nat. Mus., 28, 1905, pp. 312-313.—Grabau and Shimer, N. A. Index Fossils, 1907, 1, p. 189.—Walcott, Smiths. Misc. Coll., 53, 1908, pl. 11, pp. 142, 144; Mon. U. S. Geol. Surv., 51, 1912, p. 571.

DICELLOMUS—Continued.

Schmidtia Zittel (part) (not Volborth), *Handb. Pal.*, 1, 1880, p. 665.

Obolella Hall and Clarke (part), 11th Ann. Rep. State Geol. New York, 1892, pp. 240–241; 45th Ann. Rep. New York State Mus., 1892, pp. 556–557; *Pal. New York*, 8, pt. 1, 1892, pp. 66–73.

Dicellomus nanus (Meek and Hayden).

Obolella nana Meek and Hayden, *Proc. Acad. Nat. Sci. Philadelphia*, 13, 1862, p. 435; *Amer. Jour. Sci.*, 2d ser., 33, 1862, p. 73, figs. 1a, b, 2a, b.—Billings, *Geol. Surv. Canada, Pal. Foss.*, 1, 1862, pp. 67, 68.—Meek and Hayden, *Smiths. Cont. Knowl.*, 172, *Pal. Upper Missouri*, pt. 1, 1865, p. 4, pl. 1, figs. 3a–3d.—Whitfield, *U. S. Geogr. and Geol. Surv. Rocky Mountains Region*, *Rep. Geol. Res. Black Hills of Dakota*, by Newton and Jenney, 1880, pp. 340–341, pl. 2, figs. 14–17.—Walcott, *Bull. U. S. Geol. Surv.*, 30, 1886, p. 111.—Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, pp. 69, 70.

Dicellomus nanus Walcott (part), *Mon. U. S. Geol. Surv.*, 32, pt. 2, 1899, p. 447, pl. 60, figs. 3a–d (not fig. 3); *Proc. U. S. Nat. Mus.*, 28, 1905, pp. 314–315; *Mon. U. S. Geol. Surv.*, 51, 1912, p. 573, pl. 53, figs. 1, 1a–1, 2, 2a, 3, 3a–d.

Lower Ordovician: Near Buffalo Fork Peak, Uinta County, Wyoming. Also Upper and Middle Cambrian of Montana, Missouri, etc.

Pleniotypes.—Cat. No. 31903, 51908, U.S.N.M.

DICHOGRAPSUS Salter. See *Dichograptus* Salter.

DICHOGRAPSUS ARANEA Salter. See *Dichograptus octobrachiatus*.

DICHOGRAPSUS FLEXILIS Hall. See *Clonograptus flexilis*.

DICHOGRAPSUS LOGANI Nicholson. See *Loganograptus logani*.

DICHOGRAPSUS MILESI Hall. See *Clonograptus milesi*.

DICHOGRAPSUS OCTOBRACHIATUS Nicholson. See *Dichograptus octobrachiatus*.

DICHOGRAPSUS OCTONARIUS Hall. See *Dichograptus octonarius*.

DICHOGRAPSUS RAMULUS Gurley. See *Temnograptus? ramulus*.

DICHOGRAPSUS REMOTUS Gurley. See *Clonograptus remotus*.

DICHOGRAPSUS RIGIDUS Hall. See *Clonograptus rigidus*.

DICHOGEAPTUS Salter.

Genotype: *Dichograpsus aranea* Salter=*Graptolithus octobrachiatus* Hall.

Dichograpsus Salter, *Quart. Jour. Geol. Soc. London*, 19, 1863, p. 139.—Nicholson, *ibid.*, 24, 1868, p. 9, 127.—Carruthers, *Geol. Mag.*, 5, 1868, p. 73, 129.—Nicholson, *Mon. British Grapt.*, 1872, p. 106; *Ann. Mag. Nat. Hist.*, 4th ser., 11, 1873, p. 138.

Dichograptus, Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 217; rev. ed., 1870, p. 251.—Zittel, *Handb. Pal.*, 1, 1879, p. 299.—Tullberg, *Sver. Geol. Unders.*, ser. C, No. 55, 1883, p. 12.—Hermann, *Geol. Mag.*, dec. 3, 3, 1886, p. 21.—Barrois, *Ann. Soc. Geol. du Nord*, 21, Lille, p. 108.—Nicholson and Murie, *Geol. Mag.*, dec. 4, 2, p. 532, fig.—Wiman, *Bull. Geol. Inst. Univ. Upsala*, 2, pt. 2, 1896, p. 265.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 328.—Roemer and Frech, *Leth. geog., Leth. Pal.*, 1897, p. 594.—Elles, *Quart. Jour. Geol. Soc. London*, 54, 1898, p. 483.—Zittel-Eastman *Textb. Pal.*, 1, 1900, p. 118.—Elles and Wood, *Mon. British Grapt. Pal. Soc.*, 1902, p. 76.—Ruedemann, *Mem. New York State Mus.*, 7, pt. 1, 1904, p. 634.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1906, p. 28.—Ruedemann, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 129.

Dichograptus abnormis Hall. See *Clonograptus abnormis*.

Dichograptus divaricatus Whitfield. See *Dicellograptus divaricatus*.

Dichograptus flabelliformis Brögger. See *Dictyonema flabelliforme*.

Dichograptus furcatus Whitfield. See *Dicranograptus furcatus*.

Dichograptus logani Nicholson. See *Loganograptus logani*.

Dichograptus octobrachiatus (Hall).

Graptolithus octobrachiatus Hall, Geol. Surv. Canada, Rep. for 1857, 1858, p. 122; Geol. Surv. Canada, Can. Org. Rem., dec. 2, 1865, p. 96, pl. 7, figs. 1-7; pl. 8, figs. 1-4.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 226, fig. 232.

Dichograptus aranea Salter, Quart. Jour. Geol. Soc., 19, 1863, p. 137, figs. 9, 10.

Graptolithus (*Loganograptus*) *octobrachiatus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 174, fig. 5; pl. 3, figs. 23-27; rev. ed., 1870, p. 207, fig. 5, pl. 3, fig. 23-27.

Graptolithes (*Didymograptus*) *octobrachiatus* McCoy, Geol. Surv. Victoria, Prod. Pal. Victoria, dec. 1, 1874, p. 17, pl. 2, fig. 4.

Dichograptus octobrachiatus Nicholson, Quart. Jour. Geol. Soc., 24, 1868, p. 129, pl. 5, figs. 1, 2; Ann. Mag. Nat. Hist., 4th ser., 1, 1868, p. 56, pl. 3, fig. 6.

Dichograptus octobrachiatus Nicholson, Mon. British Grapt., 1872, p. 107, fig. 50.—Brögger, Die silurischen Etagen, 2, 3, 1882, p. 38.—Herrmann, Nyt. Mag. Naturv., 29, 1885, p. 124; Geol. Mag., dec. 3, 3, 1886, p. 22, fig. 7.—Lecrenier, Ann. Soc. Geol. Belg., 14, 1887, p. 182.—Ami, Geol. Surv. Canada Rep., 2d ser., 3, pt. 2, 1889, p. 117k.—Törnquist, Lunds Univ. Årsskrift, 26, 1891, p. 12, pl. 1, fig. 1.—Nicholson and Marr, Geol. Mag., dec. 4, 2, 1895, p. 534, fig.—Gurley, Jour. Geol., 4, 1896, p. 294.—Roemer and Frech, Leth. geog., Leth. Pal., 1, 1897, p. 595.—Elles, Quart. Jour. Geol. Soc., 54, 1898, p. 483.—Ruedemann, New York State Pal., Ann. Rep. 1902, pp. 554, 556.—Elles and Wood, Mon. British Grapt., pt. 1, 1902, p. 77, pl. 9; pl. 10, figs. 1a-e.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 634-637, pl. 8, figs. 1-7; pl. 9, figs. 1-2.—Grabau and Shimer, N. A. Index Fossile, 1, 1906, p. 28, fig. 41.

Canadian: Point Levis, Quebec (*Levis*, *Didymograptus* zone); Deepkill, Rensselaer County, New York (*Deepkill*, *Tetragraptus*, *Didymograptus*, and *Diplograptus* zones); England (*Skiddaw*); Wales (*Arenig*); Scandinavia; Belgium; Australia.

Dichograptus octonarius (Hall).

Graptolithus octonarius Hall, Canadian Nat. Geol., 3, 1858, p. 148; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 124; Geol. Surv. Canada, dec. 2, 1865, p. 95, pl. 10, figs. 1, 2.

Graptolithus (*Monoprion*) *octonarius* Hall, 20th Rep. New York State Cab. Hist., 1868, p. 226, pl. 3, fig. 22; rev. ed., 1870, p. 260, pl. 3, fig. 22; p. 223.

Dichograptus octonarius Gurley, Jour. Geol., 4, 1896, p. 95 (gen. ref.)

Dichograptus octonarius Hall (T. S.), Geol. Mag., dec. 4, 6, 1899, p. 449, pl. 22, fig. 7.

Canadian: Point Levis, Quebec (*Levis*); Australia.

Dichograptus thureaui Frech. See *Goniograptus thureaui*.

Dichotrypa grandis Ulrich.

Dichotrypa grandis Ulrich, Geol. Surv. Illinois, 8, 1890, p. 498, pl. 43, figs. 1-1e. Niagara(?): Will County, near Wilmington, Illinois(?).

Observation.—This form is probably from the St. Louis group of Illinois and may be the same as *Dichotrypa elegans* Ulrich.

DICRANELLA Ulrich.Genotype: *D. bicornis* Ulrich.

Dicranella Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 664; Zittel-Eastman Textb. Pal., 1, 1900, p. 644.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 349.—Baesler, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 738.

Dicranella bicornis Ulrich.

Dicranella bicornis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 665, pl. 44, fig. 26; pl. 46, figs. 39, 40.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 349, fig. 1657, j, k.—Baesler, Zittel-Eastman Textb. Pal., 1913, p. 738, fig. 1425d. *Beyrichia bicornis* Miller, N. A. Geol. Pal., 2d App., 1897, p. 787 (gen. ref.). Black River (Decorah): Minneapolis and St. Paul, Minnesota. *Cotypes*.—Cat. No. 41366, U.S.N.M.

Dicranella? byrnesi (Miller).

Leperditia Byrnesi Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 123, fig. 10; N. A. Geol. Pal., 1889, p. 552, fig. 1020. *Æchmina Byrnesi* Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 12, pl. 3, figs. 9–11. *Dicranella? byrnesi* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 664. Eden (Fulton): Cincinnati, Ohio, and vicinity.

Dicranella marginata Ulrich.

Dicranella marginata Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 666, pl. 44, figs. 27, 28. *Beyrichia marginata* Miller, N. A. Geol. Pal., 2d App., 1897, p. 786 (gen. ref.). Black River (Decorah): Fountain, Minnesota. *Holotype*.—Cat. No. 41368, U.S.N.M.

Dicranella? simplex Ulrich.

Dicranella? simplex Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 666, pl. 44, figs. 24, 25; pl. 46, fig. 42. *Beyrichia simplex* Miller, N. A. Geol. Pal., 2d App., 1897, p. 787 (gen. ref.). Black River (Decorah): Fountain, Minnesota. *Holotype*.—Cat. No. 41367, U.S.N.M.

Dicranella spinosa Ulrich.

Dicranella spinosa Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 665, pl. 44, fig. 23; pl. 46, fig. 41. *Beyrichia spinosa* Miller, N. A. Geol. Pal., 2d App., 1897, p. 787 (gen. ref.). Black River (Decorah): Minneapolis, Minnesota. *Holotype*.—Cat. No. 41369, U.S.N.M.

DICRANISCUS Meek. See *Triplecia* Hall.

DICRANOGRAPTUS Hall.Genotype: *Graptolithus ramosus* Hall.

Dicranograptus Hall, Can. Org. Remains, dec. 2, 1865, p. 112; 20th Rep. New York State Cab. Hist., 1868, p. 218; rev. ed., 1870, p. 252.—Carruthers, Geol. Mag., 5, 1868, p. 73, 132.—Hopkinson, Geol. Mag., 7, 1870, p. 353.—Richter, Zeits. d. d. geol. Gesell., 27, 1875, p. 286.—Zittel, Handb. Pal., 1, 1879, p. 300.—Tullberg, Sveriges Geol. Unders., ser. C, No. 55, 1883, pp. 12, 14.—Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 562.—Miller, N. A. Geol. Pal., 1889, p. 185.—James, Jour. Cincinnati Soc. Nat. Hist., 14, pt. 2, 1892, p. 160.—Gurley, Jour. Geol., 4, 1896, p. 71.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, 1896, p. 284.—Koken, Die Leitfossilien, Leipzig, 1896, p. 329.—Roemer and Frech, Leth. geog., Leth. Pal., 1897, p. 615.; Zittel-Eastman

DICRANOGRAPTUS—Continued.

Textb. Pal., 1, 1900, p. 119.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 315–317; Zittel-Eastman Pal., 2d ed., 1913, p. 130.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 32.

Dicranograptus Nicholson, Ann. Mag. Nat. Hist., 4th ser., 6, 1870, p. 371; Mon. British Grapt., 1872, p. 118.

DICRANOGRAPTUS ARKANSASENSIS Gurley. See *Dicranograptus ramosus arkansensis*.

DICRANOGRAPTUS ARUNDINACEUS Hall. See *Mastigograptus arundinaceus*.

Dicranograptus contortus Ruedemann.

Dicranograptus contortus Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 337–338, pl. 23, fig. 9; figs. 275–278.

Chazy (Normanskill): Kenwood and Troy, New York.

DICRANOGRAPTUS DISSIMILARIS Emmons. See *Diplograptus foliaceus*.

DICRANOGRAPTUS DIVARICATUS Walcott. See *Dicellograptus divaricatus*.

DICRANOGRAPTUS FORMOSUS Hopkinson. See *Dicellograptus sextans*.

Dicranograptus furcatus (Hall).

Graptolithus furcatus Hall, Pal. New York, 1, 1847, p. 237, pl. 74, figs. 4a–h.—Chapman, Can. Jour., 1, 1856, p. 390, fig. 10.

Dicranograptus furcatus Hall, Geol. Surv. Canada Can. Org. Rem., dec. 2, 1865, p. 15.—Lapworth, Ann. Mag. Nat. Hist., 5, 1880, p. 283.—Walcott, Alb. Inst. Trans., 10, 1883 (Adv. sheet, 1879), p. 34.—Whitfield, Am. Jour. Sci., 3d ser., 26, 1883, p. 380.—Walcott, Geol. Soc. Bull., 1, 1890, p. 339.—Gurley, Jour. Geol., 4, 1896, p. 297.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 334–336, pl. 23, fig. 7; text fig. 272.

Dicranograptus nicholsoni Frech, Leth. Pal., 1, 1897, p. 617, fig. 181.

Chazy (Normanskill): Glenmont, etc., New York; Silver Peak Quadrangle, Nevada.

Pteriotypes.—Cat. No. 54251, U.S.N.M.

Dicranograptus furcatus exilis Ruedemann.

Dicranograptus furcatus var. *exilis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 337, pl. 23, fig. 8; figs. 273–274.

Chazy (Normanskill): Kenwood, New York.

DICRANOGRAPTUS INÆQUALIS (Emmons). See *Cladograptus inæqualis*.

Dicranograptus nicholsoni Hopkinson.

Dicranograptus nicholsoni Hopkinson, Geol. Mag., 7, 1870, p. 357, pl. 16, fig. 3.—Lapworth, Cat. West. Scott. Foss., 1876, p. 6, pl. 3, fig. 79; Belfast Nat. Field Club, Rep. and Proc., App., 1, pt. 4, 1877, p. 141, pl. 7, fig. 2.—Tullberg, Sver. Geol. Unders., ser. C, No. 50, 1882, p. 20.—Gurley, Jour. Geol., 4, 1896, p. 297.—Elles and Wood, Mon. British Grapt., pt. 4, 1904, p. 171, pl. 25, figs. 1a–h.—T. S. Hall, Proc. Roy. Soc. Victoria, 18, 1905, p. 24, pl. 6, fig. 7; Rec. Geol. Surv. Victoria, 1, pt. 4, 1906, p. 274.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 317–320, pl. 20, figs. 3, 5; pl. 21, fig. 1; figs. 241, 242.

Middle Ordovician: Great Britain (Glenkiln and Hartfell); Scania; Victoria; Saratoga County, etc., New York (Trenton-Utica); Ohio (Fulton).

Pteriotypes.—Cat. Nos. 54247, 54269, U.S.N.M.

DICRANOGRAPTUS NICHOLSONI Frech. See *Dicranograptus furcatus*.

DICRANOGRAPTUS NICHOLSONI ARKANSASENSIS Gurley. See *Dicranograptus ramosus arkansasensis*.

Dicranograptus nicholsoni diapason Gurley.

Dicranograptus nicholsoni var. *diapason* Gurley, Jour. Geol., 4, 1896, p. 73.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 322–324, pl. 21, figs. 3–5, figs. 249–254.

Chazyan (Normanskill): Glenmont, Stockport, etc., New York; Arkansas.
Cotype.—Cat. No. 54286, U.S.N.M.

Dicranograptus nicholsoni parvangelus Gurley.

Dicranograptus nicholsoni var. *parvangelus* Gurley, Ann. Rep. Geol. Surv. Arkansas, 3, 1892, p. 417; Jour. Geol., 4, 1896, p. 73.—Ruedemann, Bull. New York State Mus., 11, pt. 2, 1908, pp. 320–322, pl. 21, fig. 2, figs. 243–248.
Chazyan (Normanskill): Mount Moreno, Glenmont, Stockport, etc., New York; Arkansas.

Cotypes.—Cat. Nos. 54257, 54258, U.S.N.M.

Dicranograptus nicholsoni parvulus Ruedemann.

Dicranograptus nicholsoni var. *parvulus* Ruedemann, Bull. New York State Mus., 162, 1912, p. 78, figs. 17, 18.

Trenton (Canajoharie): Near Pattersonville, New York.

Dicranograptus nicholsoni whitianus (Miller).

Graptolithus (*Climacograptus*) *ramulus* White (preoccupied), Wheeler's Expl. Surv. West 100th Merid., 4, pt. 1, 1877, p. 62, pl. 4, figs. 3a–c.

Graptolithus whitianus Miller, Amer. Pal. Foss., 2d ed., 1883, p. 269.

Dicranograptus nicholsoni var. *whitianus* Gurley, Jour. Geol., 4, 1896, p. 72, 300.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 324.

Chazyan (Normanskill zone): Five miles north of Summit, Nevada.

Holotype.—Cat. No. 8555, U.S.N.M.

DICRANOGRAPTUS RAMOSUS Hopkinson. See *Dicranograptus spinifer*.

Dicranograptus ramosus (Hall).

Graptolithus ramosus Hall, Pal. New York, 1, 1847, p. 270, pl. 73, fig. 3a–h.—Salter, Geol. Soc. Quar. Jour., 5, 1848, p. 16, pl. 1, fig. 7; Geol. Surv. Canada, dec., 1865, p. 15, fig. 20.—Chapman, Canadian Jour., 8, 1863, p. 205, text fig. 203.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 200, fig. 194.

Graptolithus (*Dicranograptus*) *ramosus* Hall, New York State Cab. Nat. Hist., 20th Ann. Rep., 1868, p. 181, fig. 21; pl. 2, figs. 18–21, p. 227; rev. ed., 1870, p. 212.

Cladograpsus ramosus Geinitz, Die Graptolithen, 1852, p. 29.—McCoy, Geol. Surv. Victoria, dec. 2, 1875, pl. 20, fig. 2.

Cladograpsus sp. undet. Emmons, Amer. Geology, 1856, pl. 1, fig. 12.

Dicranograptus ramosus Salter, Mem. Geol. Surv. Great Britain, 3, 1866, p. 330, pl. 11A, fig. 1; Siluria, 4th ed., 1866, p. 541, fig. 4.—Nicholson, Mon. British Grapt., 1872, p. 119, fig. 60.—Lapworth, Cat. West. Scot. Foss., 1876, p. 6, pl. 4, fig. 80.—Whitfield, U. S. Geog. Surv. West 100th Merid., Wheeler's Rep., 1877.—Walcott, Alb. Inst. Trans., 10, 1883 (Advance sheet, 1879, p. 34).—Lapworth, Roy. Soc. Canada Trans., 5, sec. 4, 1886, p. 184.—Ami, Canadian Geol. Surv. Rep., 2d ser., 3, pt. 2, 1889, p. 117K.—Miller, N. A. Geol. Pal., 1889, p. 185, fig. 167.—Walcott, Bull. Geol. Soc., 1, 1890, 339.—Gurley, Geol. Surv. Arkansas Ann. Rep., 3, 1892, p. 411.—James, Jour. Cincinnati

Dicranograptus ramosus—Continued.

Soc. Nat. Hist., 14, 1892, p. 160.—Gurley, Jour. Geol., 4, 1896, p. 297.—T. S. Hall, Proc. Roy. Soc. Victoria, 9, 1896, pl. 1, p. 184.—Roemer and Frech, Leth. geog., Leth. Pal., 1, 1897, 616, fig. 180.—T. S. Hall, Geol. Mag., n. s., dec. 4, 6, 1899, 445.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 496ff.—T. S. Hall, Geol. Surv. Victoria Rec., 1, pt. 1, 1902, p. 33.—Clark, Geol. Mag. (4), 9, 1902, p. 498.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 55, 213, pl. 16, figs. 10, 11.—Elles and Wood, Mon. British Grapt., 1904, p. 175, pl. 24, figs. 6a, b.—Dale, Bull. U. S. Geol. Surv., 242, 1904, p. 33.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 32, fig. 52.—Ruedemann, Mem. New York State Mus., 11, pt. 2, pp. 325–328, pl. 23, fig. 1, text figs. 255, 256, 411.

Middle Ordovician: Mount Moreno, Kenwood, Stockport, etc., New York; Canada; New Jersey; Arkansas; Oklahoma (Normanskill); Victoria and Australia. Hartfell and Glenkiln shales of Great Britain.

Dicranograptus ramosus arkansasensis (Gurley).

Dicranograptus arkansasensis Gurley, Geol. Surv. Arkansas, Ann. Rep., 3, 1892, p. 416, pl. 9, figs. 1, 2.

Dicranograptus nicholsoni arkansasensis Gurley, Jour. Geol., 4, 1896, p. 72.

Dicranograptus ramosus var. *arkansasensis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 329, figs. 257, 258.

Middle Ordovician: Arkansas (Normanskill); Great Britain (Glenkiln).

Cotype.—Cat. No. 54261, U.S.N.M.

DICRANOGRAPTUS RAMOSUS var. **SPINIFER** Elles and Wood. See *Dicranograptus spinifer*.

DICRANOGRAPTUS RAMULUS Herrman. See *Dicranograptus nicholsoni whitianus*.

Dicranograptus rectus Hopkinson.

Graptolithus ramosus Salter, Quart. Jour. Geol. Soc. London, 5, 1849, p. 16, pl. 1, fig. 7.

Dicranograptus rectus Hopkinson, Geol. Mag., 9, 1872, p. 508, pl. 12, fig. 10.—Elles and Wood, Mon. British Grapt., 4, 1904, p. 169, pl. 24, figs. 4a–c.

Ordovician: South Scotland (Glenkiln); Arkansas (Normanskill–Stringtown).

DICRANOGRAPTUS SEXTANS Hopkinson. See *Dicellograptus sextans*.

Dicranograptus spinifer (Lapworth) Elles and Wood.

Dicranograptus ramosus Hopkinson, Geol. Mag., 7, 1870, p. 358, pl. 16, fig. 5.—Lapworth, Belfast Nat. Field Club, Rep. and Proc., App., 1, pt. 4, 1877, p. 140, pl. 7, fig. 1.

Dicranograptus ramosus var. *spinifer* (Lapworth MS.) Elles and Wood, Mon. British Grapt., pt. 4, 1904, p. 176, pl. 24, figs. 8a–c.

Dicranograptus spinifer Lapworth, Geol. Soc. Quart. Jour. London, 38, 1882, p. 610.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 330–333, pl. 22; pl. 23, figs. 2, 3, figs. 259–263.

Middle Ordovician: Great Britain (Hartfell and Glenkiln); Glenmont, Stockport, and Mount Moreno, New York (Normanskill).

Dicranograptus spinifer geniculatus Ruedemann.

Dicranograptus spinifer var. *geniculatus* Ruedemann, Bull. New York State Mus., 11, pt. 2, 1908, pp. 333, 334, pl. 23, figs. 4–6, text figs. 265–267.

Chazyan (Normanskill): Glenmont, and Mount Moreno, New York.

DICRANOPELTIS Hawle and Corda.Genotype: *Lichas scabra* Beyrich.

Dicranopeltis Hawle and Corda, Abh. d. k. böhmischen Gesell. Wiss., 5, 1847 (extract), p. 141, pl. 7, fig. 75.—Gurich, Neues Jahrb. Min., Geol. Pal., 14, Beilage-Band, 1901, p. 525.—Reed, Quart. Jour. Geol. Soc. London, 58, 1902, pp. 63, 61; sec. B, pp. 71, 82.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 310.

Dicranopeltis arkansana (Van Ingen).

Arges arkansana Van Ingen, School of Mines Quart., 23, 1901, p. 61, fig. 19, pl. figs. 19–21.

Niagaran (St. Clair): St. Clair Springs, Independence County, Arkansas.

Dicranopeltis decipiens (Winchell and Marcy).

Lichas breviceps? Hall, Adv. sheets., 18th Rep. New York State Cab. Nat. Hist., 1865, p. 30 (not Hall, 1864); 20th Rep. New York State Cab. Nat. Hist., 1867, p. 334, p. 377, pl. 21, figs. 12–14; rev. ed., 1870, p. 424, pl. 21, figs. 12–14.

Lichas decipiens Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 104, pl. 3, fig. 11.

Lichas emarginatus Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 199.

Dicranopeltis decipiens Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 237, pl. 22, figs. 10, 11.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 311, fig. 1621f, g.

Niagaran (Racine): Bridgeport, Hawthorn, and Lemont, Illinois; Grafton, Wisconsin.

Dicranopeltis nasuta Weller.

Dicranopeltis nasuta Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 240, pl. 22, figs. 5–7.

Niagaran (Racine): Milwaukee, Wisconsin.

Dicranopeltis telleri Weller.

Dicranopeltis telleri Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 241, pl. 22, figs. 8–9.

Niagaran (Racine): Milwaukee, Wisconsin.

DICRANOPOREA Ulrich.Genotype: *Ptilodictya internodia* Miller and Dyer.

Dicranopora Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, pp. 152, 166.—Miller, N. A. Geol. Pal., 1889, p. 300.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 389.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, p. 14.—Simpson, 14th Ann. Rep. State Geol. New York for the year 1894, 1897, p. 545.—Nickles and Basler, Bull. U. S. Geol. Surv., 173, 1900, p. 49.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 745.

Dicranopora emacerata (Nicholson).

Ptilodictya emacerata Nicholson, Ann. Mag. Nat. Hist., 4th ser., 15, 1875, p. 179, pl. 14, figs. 3–3b; Pal. Ohio, 2, 1875, p. 261, pl. 25, figs. 5–5b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 826, figs.

Dicranopora emacerata Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 40.—Whiteaves, Pal. Foss., 3, 1895, p. 118.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 827, pl. 32, figs. 13, 13b.

Maysville and Richmond: Cincinnati, Ohio, and vicinity; Stony Mountain, Manitoba; Anticosti.

Dicranopora fragilis (Billings).

Ptilodictya fragilis Billings, Catal. Sil. Foss. Anticosti, 1866, p. 9.

Stictopora fragilis Whitfield, Geol. Surv. Wisconsin, 4, 1882, p. 253, pl. 11, fig. 24.

Dicranopora fragilis—Continued.

Dicranopora fragilis Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1899, p. 40.—Whiteaves, Pal. Foss., 3, 1895, p. 118.

Richmond: Charleton Point, Anticosti (Charleton); Iron Ridge, Wisconsin (Maquoketa); Stony Mountain, Manitoba (Stony Mountain).

Dicranopora internodia (Miller and Dyer).

Ptilodictya internodia Miller and Dyer, Contr. to Pal., No. 2, 1878, p. 7, pl. 4, figs. 7, 7a.

Dicranopora internodia Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 166, pl. 7, figs. 9, 9a.—Miller, N. A. Geol. Pal., 1889, fig. 471 (p. 300).

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

DICRANOPORA LATA Ulrich. See *Rhinidictya lata*.

Dicranopora meeki (James).

Helopora meeki James, Paleontologist, No. 1, 1878, p. 3.

Dicranopora meeki Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 36, pl. 5, fig. 1.

Maysville (Mount Hope): Cincinnati, Ohio, and vicinity.

DICRANOPORA NITIDULA Miller. See *Rhinidictya nitidula*.

Dicranopora parva Ami.

Not recognizable.

Dicranopora parva Ami, Canadian Rec. Sci., 5, 1892, p. 99.

Trenton: Gagnon's Beach, Quebec.

DICRANOPORA TRENTONENSIS Ulrich. See *Rhinidictya trentonensis*.

DICTUOCRINITES Conrad. See *Receptaculites Defrance*.

DICTUOLITES BECKII Hall. See *Lithodictyon becki*.

DICTYOCEPHALITES Bergeron. See *Harpides Beyrich*.

DICTYOCRINUS Hall. See *Ischadites Murchison*.

DICTYOCRINUS Conrad. See *Receptaculites Defrance*.

DICTYOGRAPTUS Moberg. See *Dictyonema Hall*.

DICTYOGRAPTUS (DESMOGRAPTUS) CANCELLATUS Hopkinson. See *Desmograptus cancellatus*.

DICTYOGRAPTUS RETICULATUS Ulrich. See *Dictyonema arbusculum*.

DICTYONELLA Hall.

Genotype: *Rhynchonella? reticulata* Hall.

Dictyonella Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 274.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, pp. 81, 99; Zittel-Eastman Textb. Pal., 1, 1896, p. 312; 2d ed., 1913, p. 396.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 179; Bull. New York State Mus., 45, 1901, p. 179.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 209.

Eichwaldia Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, pp. 274–277, with figs.—Dall, Amer. Jour. Conch., 6, 1870, p. 98.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 307; 13th Ann. Rep. New York State Geol., 1895, p. 903.

Dictyonella anticostiensis (Billings).

Eichwaldia anticostiensis Billings, Cat. Sil. Foss. Anticosti, 1896, p. 10.

Dictyonella anticostiensis Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 211.

Richmond (Charleton): Near West End Lighthouse, Anticosti.

Dictyonella concinna (Hall).

Eichwaldia concinna Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 278.—Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 83, fig. 5.

Dictyonella concinna Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 211.—Foerste, Jour. Geol., 11, 1903, p. 709 (loc. occ.).

Niagaran (Brownsport): Perry and Decatur Counties, Tennessee.

Dictyonella corallifera (Hall).

Atrypa corallifera Hall, Pal. New York, 2, 1852, p. 281, pl. 58, fig. 5.

Eichwaldia corallifera Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 278.

Dictyonella corallifera Schuchert, Bull. U. S. Geol., 87, 1897, p. 211.—Grabau, Bull. New York State Mus., 45, 1901, p. 179, fig. 83; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 179, fig. 83.

Clinton (Rochester): Lockport, Rochester, etc., New York; Ontario.

Dictyonella gibbosa (Hall).

Eichwaldia gibbosa Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 278.—Hall and Clarke, Pal. New York, 8, pt. 2, 1895, pl. 83, figs. 6, 7.

Dictyonella gibbosa Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 211.—Foerste, Jour. Geol., 11, 1903, p. 709.

Niagaran (Brownsport): Perry and Decatur Counties, Tennessee.

Dictyonella reticulata (Hall).

Rhynchonella? *reticulata* Hall, Trans. Albany Inst., 4, 1863, p. 217.

Eichwaldia reticulata Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, pp. 275–277, figs. 1–7; 28th Rep., *ibid.*, 1879, p. 169, pl. 26, figs. 50–54; 11th Rep. State Geol. Indiana, 1882, p. 312, pl. 26, figs. 50–54.—Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 91, pl. 13, fig. 4.—Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 31, pl. 3, figs. 11–13.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 308, figs. 229–235; pl. 83, figs. 8–13.—Foerste, Geol. Ohio, 7, 1895, p. 594, pl. 25, fig. 4.

Dictyonella reticulata Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 211.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 210, fig. 247.

Silurian: Waldron, Indiana, and Newsom, Tennessee (Waldron); Dayton, Ohio (Brassfield); Wisconsin.

DICTYONEMA Hall.

Genotype: *Gorgonia?* *retiformis* Hall;

Dictyonema Hall, Amer. Jour. Sci. Arts, 2d ser., 11, 1851, p. 401; Pal. New York, 2, p. 174.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 171.—Hall, Canadian Nat. Geol., 3, 1858, p. 174; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 142; Pal. New York, 3, p. 15; Geol. Surv. Canada, dec. 2, 1865, p. 136; 20th Rep. New York State Cab. Hist., 1868, p. 218, rev. ed., p. 252.—Nicholson, Mon. British Grapt., 1872, p. 129.—Dames, Zeits. d. d. geol. Gesell., 25, 1873, p. 383.—Zittel, Handb. Pal., 1, 1879, p. 289.—Salter, Mem. Geol. Surv. Great Britain, 3, 1881, p. 331; 2d ed., p. 535.—Spencer, Bull. Mus. State Missouri, 1, 1884, p. 22; Trans. Acad. St. Louis, 4, 1884, pp. 262, 572.—Miller, N. A. Geol. Pal. 1889, p. 185.—Holm, Bihang till K. Sv. Vet.-Akad. Handl., 16, Afd. 4, No. 7, 1890, p. 4.—Moberg, Geol. Foren. Stockholm Forhandl., 13, 1891, p. 216; *ibid.*, 16, 1894, p. 236.—Matthew, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 33.—James, Jour. Cincinnati Soc. Nat. Hist., 16, 1892, p. 153.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 190.—Moberg, Geol. Foren. Stockholm Forhandl., 16, 1894, p. 236.—Tornquist, Geol. Foren. Stockholm Forhandl., 16, 1894, p. 380.—Gurley, Jour. Geol., 4, 1896, p. 81.—Koken, Die Leitfossilien, Leipzig, 1896, p. 327, fig. 239.—Wiman, Nat. Sci., 9, 1896, p. 243.—Frech, Leth. Geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 557.—Grabau, Bull.

DICTYONEMA—Continued.

Buffalo Soc. Nat. Sci., 6, 1899, p. 119; *ibid.*, 7, 1901, p. 133; Bull. New York State Mus., 45, 1901, p. 133.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 591, 592.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 24.—Ruedemann, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 128.

Dictyograptus Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 667.—Moberg, Geol. Foren. Stockholm Forhandl., 16, 1894, p. 236.—Tornquist, *ibid.*, 16, 1894, p. 380.

Dictyonema arbusculum (Ulrich).

Dictyonema irregularis James (not Hall), Paleontologist, 3, 1879, p. 22.

Dictyograptus reticulatus Ulrich, Cat. Foss. Cincinnati group, 1880, p. 61 (nom. nud.).

Inocaulis arbuscula Ulrich, Cincinnati Soc. Nat. Hist. Jour., 2, 1879, p. 28, pl. 7, figs. 27, 27a.—Gurley, Jour. Geol., 4, 1896, p. 300.

Calyptograptus? arbusculus Spencer, Acad. Sci. St. Louis Trans., 4, 1884, p. 563, footnote (gen. ref.).

Dictyonema arbusculum Gurley, in J. F. James, Cincinnati Soc. Nat. Hist. Jour., 1892, p. 153, 16, pt. 2.—Nickles, *ibid.*, 20, 1902, p. 72.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 151–153, figs. 57, 58; Bull. New York State Mus., 162, 1912, p. 77, pl. 2, fig. 15.

Eden: Covington, Kentucky, and vicinity (Southgate); Indian Ladder, New York (Indian Ladder).

Holotype and *plesiotype*.—Cat. Nos. 54288, 54289, U.S.N.M.

Dictyonema areyi Gurley.

Dictyonema areyi (Gurley MS.) Ruedemann, Mem. New York State Mus., 11, 1908, p. 164, pl. 4, fig. 2; text fig. 73.

Clinton (Rochester): Rochester, New York.

Dictyonema canadense (Whiteaves).

Inocaulis Canadensis Whiteaves, Pal. Foss. Geol. Surv. Canada, 3, pt. 3, 1897, p. 149, pl. 17, fig. 4.

Dictyonema canadensis Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 131 (gen. ref.).

Black River or Richmond: Inmost Island, Lake Winnipeg, Canada.

DICTYONEMA (DESMOGRAPTUS) CANCELLATUM Ruedemann. See *Desmograptus cancellatus*.

Dictyonema crassibasale Gurley.

Dictyonema gracilis Spencer (not Hall), Canadian Nat., 8, 1878, p. 458; *ibid.*, 10, 1882, p. 165; Trans. Acad. Sci. St. Louis, 4, 1884, pp. 573, 574, pl. 2, figs. 2, 3; Bull. Mus. Univ. State Missouri, 1, 1884, p. 24, pl. 2, figs. 2, 2a, 3.

Dictyonema crassibasale (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 19–24, pl. 3, fig. 1; text figs. 21–25.

Niagaran dolomite: Hamilton, Ontario.

DICTYONEMA DELICATULUM Dawson. See *Dictyonema perexile*.

Dictyonema desmoides Gurley.

Dictyonema desmoides (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 34, 35, pl. 4, fig. 3; text figs. 41–43.

Niagaran dolomite: Hamilton, Ontario.

Dictyonema expansum Spencer.

Dictyonema expansum Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, pp. 464, 575, 576, pl. 2, fig. 1; Bull. Mus. Univ. State Missouri, 1, 1884, pp. 14, 25, 26, pl. 2, fig. 1.—Gurley, Jour. Geol., 4, 1896, pp. 96, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 31–33, figs. 36, 37.

Niagaran dolomite: Hamilton, Ontario.

Dictyonema filiramus Gurley.

Dictyonema filiramus (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 34, figs. 38–40.

Niagaran dolomite: Hamilton, Ontario.

Dictyonema flabelliforme (Eichwald).

Gorgonia flabelliformis Eichwald, Sil. Schicht. in Estland, 1840, p. 207; Urwelt Russl., 1842, p. 45, tab. 1, fig. 6.

Fenestella flabelliformis Eichwald, Soc. Natur. Moscou, No. 1, 1854, p. 6; *ibid.*, 1855, No. 4, p. 453.

Rhabdinopora flabelliformis Eichwald, Leth. Ross., 1860, p. 369.

Dictyograptus flabelliformis Brögger, Die sil. Etagen 2 and 3, etc., 1882, p. 30, pl. 12, figs. 17–19.

Dictyonema flabelliformis Roemer, Zeits. d. d. geol. Gesell., 11, 1859, p. 558.—Tornquist, Lunds Univ. Arskrift, 2, 3, 1865, p. 22, pl. 1, fig. 14.—Tullberg, Bih. till K. Svenaka Vet.-Akad. Handl., 6, No. 13, 1882.—Schmidt, Quart. Jour. Geol. Soc., 1862, p. 517.—Dawson, Rep., Peter Ridpath Mus., McGill Univ., 1883, p. 16.—Moberg, Sver. Geol. Und. Afh. och. upps., ser. c, No. 109, 1890, p. 31.—Matthew, Trans. Roy. Soc. Canada, 9, 1892, p. 34, pl. 12, figs. 1–3b; Trans. Roy. Soc. Canada, 10, 1893, sec. 4, p. 10, footnote.—Wiman, Bull. Geol. Inst. Upsala, 2, pt. 2, 1895, p. 55, pl. 10, figs. 13, 14.—Matthew, Trans. New York Acad. Sci., 14, 1895, p. 262, 272, pl. 49, figs. 1, 2.—Wiman, Nat. Sci., 9, 1896, p. 245.—Roemer and Frech, Leth. Geog., 1 Theil, Pal. 1., 1897, p. 572, pl. 2, figs. 3a, b.—Dale, U. S. Geol. Surv., 19th Ann. Rep., pt. 3, 1899, p. 185.—Ruedemann, New York State Mus., 1903, p. 936; Mem. New York State Mus., 7, pt. 1, 1904, pp. 599–606, pl. 1, figs. 1–22, text figs. 26, 27.—Moberg, Lunds Univ., Arskrift, N. F. Afdeln, 2, vol. 2, No. 7, pl. 1, fig. 6, 1906.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 24, fig. 32.—Westergard, Lunds Univ. Arskrift, N. F., Afdeln, 2, vol. 5, No. 3, 1909, pl. 3, figs. 3–5.

Graptopora socialis Salter, Amer. Assoc. Proc., 11, 1857, p. 65.

Dictyonema sociale Salter, Mem. Geol. Surv., 3, 1866, p. 331, pl. 4, fig. 1.—Lapworth, Trans. Roy. Soc. Canada, 4, 1887, p. 168, sec. 4.

Dictyonema graptolithinum Kjerulf, Veiviser Christiania, 1865, pp. 1, 3, figs. 4, 5.

Bryograptus? multiramosus Gurley, Jour. Geol., 4, 1896, p. 64.

Dictyonema norvegicum Kjerulf, Veiviser Christiania, 1865, pp. 1, 2, figs. 1–3.

Dictyonema flabelliforme var. *Norvegicum*, Matthew, Trans. Roy. Soc. Canada, 9, sec. 4, 1892, p. 37.—Hahn, Ann. New York Acad. Sci., 22, 1912, p. 139.

Dictyonema flabelliforme var. *Acadicum* Matthew, Trans. Roy. Soc. Canada, 9, sec. 4, 1892, p. 36.—Hahn, Ann. New York Acad. Sci., 22, 1912, p. 137.

Dictyonema flabelliforme var. *confertum* Matthew, Trans. Roy. Soc. Canada, 9, sec. 4, 1892, p. 36.—Hahn, Ann. New York Acad. Sci., 22, 1912, p. 138.

Dictyonema flabelliforme *ruedemanni* Hahn, Ann. New York Acad. Sci., 22, 1912, p. 139.

Dictyonema flabelliforme *desmograptus* Hahn, Ann. New York Acad. Sci., 22, 1912, p. 139.

Dictyonema flabelliforme—Continued.

Canadian (*Dictyonema flabelliforme* bed): Esthonia, Russia, Sweden, Wales, Belgium, etc.; slate belt of Rensselaer and Washington Counties, New York; Vermont; St. John Basin, New Brunswick.

DICTYONEMA FLABELLIFORME var. **ACADIUM** Matthew. See *Dictyonema flabelliforme*.

DICTYONEMA FLABELLIFORME var. **CONFERTUM** Matthew. See *Dictyonema flabelliforme*.

DICTYONEMA FLABELLIFORME **DESMOGRAPTUS** Hahn. See *Dictyonema flabelliforme*.

DICTYONEMA FLABELLIFORME **NORVEGICA** Hahn. See *Dictyonema flabelliforme*.

DICTYONEMA FLABELLIFORME **RUEDEMANNI** Hahn. See *Dictyonema flabelliforme*.

Dictyonema furciferum Ruedemann.

Dictyonema n. sp. Ruedemann, New York State Pal., Ann. Rep., 1902, p. 570.

Dictyonema furciferum Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 606, 607, pl. 3, fig. 11, text fig. 28.

Callograptus grabaui Hahn, Annals New York Acad. Sci., 22, 1912, p. 142, figs.

Canadian: Deepkill, Rensselaer County, New York (Deepkill, *Tetragraptus* and *D. bifidus* zones); Bellefonte, Pennsylvania (base of Stonehenge); Point Levis, Quebec (*Levis Diplograptus dentatus* zone).

Dictyonema gracile Hall.

Gorgonia? Hall, Geol. New York, 4th Dist., 1843, p. 115, fig. 42.

Dictyonema gracilis Hall, Pal. New York, 2, 1852, p. 175, pl. 40G, fig. 1a-d.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 7, fig. 2.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 225.—Rominger, Geol. Surv. Michigan, 1, pt. 3, 1873, p. 44.—Lesquereux, Geol. Surv. Indiana, 13th Rep., 1883, p. 30.—Pocta, Syst. Sil. Centre Boheme, 8, 1894, p. 193.—Gurley, Jour. Geol., 4, 1896, p. 308.—Gribaui and Shimer, N. A. Index Fossils, 1, 1906, p. 25, fig. 34.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 157, pl. 1, fig. 5, text figs. 65–68.

Clinton (Rochester): Lockport, etc., New York; Ontario.

DICTYONEMA GRACILIS Spencer. See *Dictyonema crassibasale*.

Dictyonema grande Nicholson.

Dictyonema grandis Nicholson, Ann. Mag. Nat. Hist., 4th Ser., 11, 1873, p. 134, fig. 1.

Canadian (*Levis*): Point Levis, Quebec.

DICTYONEMA GRAPTOLITHINUM Kjerulf. See *Dictyonema flabelliforme*.

DICTYONEMA HISINGERI Göppert. See *Dictyonema flabelliforme*.

Dictyonema irregulare Hall.

Dictyonema irregularis Hall, Geol. Surv. Canada, dec. 2, 1865, p. 136, pl. 20, figs. 1, 2.—Hoek, Neues Jahrb. Min., Geol., Pal., 34, 1912, p. 225, pl. 2, figs. 3–5.

Canadian: Point Levis, Quebec (*Levis, Diplograptus dentatus* zone); Bolivia.

DICTYONEMA IRREGULARIS James. See *Dictyonema arbusculum*.

Dictyonema multiramum Ruedemann.

Dictyonema multiramum Ruedemann, Bull. New York State Mus., 162, 1912, p. 78, pl. 2, fig. 16.

Trenton (Schenectady): Rotterdam Junction, New York.

***Dictyonema murrayi* Hall.**

Dictyonema murrayi Hall, Canadian Org. Rem., Geol., Surv. Canada, dec. 2, 1865, p. 138, pl. 20, figs. 6, 7.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, p. 606, pl. 3, fig. 12.

Canadian: Point Levis, Quebec (Levis, Clonograptus zone), Rensselaer County, New York (Deerpkill).

Pteriotype.—Cat. No. 54287, U.S.N.M.

***Dictyonema murrayi tarijense* Hoek.**

Dictyonema murrayi var. *tarijense* Hoek, Neues Jahrb. Min., Geol., Pal., 34, 1912, p. 224, pl. 12, figs. 1, 2.

Lowest Ordovician: Tarija, Bolivia.

***Dictyonema neenah* Hall.**

Dictyonema neenah Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 7; 20th Rep. New York State Cab. Nat. Hist., 1878, p. 225.—Pocta, Syst. Sil. Centre Boheme, 8, 1894, p. 193.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, pl. 5, fig. 13, p. 47.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 150.

Black River (Platteville): Fox River, near Appleton, Wisconsin.

DICTYONEMA NORVEGICUM Kjerulf. See *Dictyonema flabelliforme*.

***Dictyonema obovatum* Gurley.**

Dictyonema obovatum Gurley, Ann. Rep. Geol. Surv. Arkansas, 1890, 3, 1892, p. 418; Jour. Geol., 4, 1896, p. 300.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 151.

Chazyan (Normanskill-Stringtown): Near Crystal Springs, Arkansas.

***Dictyonema parallelum* Gurley.**

Dictyonema parallelum (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 37, 38, pl. 4, fig. 2, text fig. 47.

Niagaran dolomite: Hamilton, Ontario.

***Dictyonema percrassum* Gurley.**

Dictyonema percrassum (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 35, 36, figs. 44, 45.

Niagaran dolomite: Hamilton, Ontario.

***Dictyonema perexile* Gurley.**

Dictyonema delicatulum Dawson (not Lapworth), Canadian Nat. Geol., 10, 1883, p. 461 (footnote).—Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 96.

Canadian: Point Levis, Quebec (Levis); St. John, New Brunswick (Bretonian—Div. C3d).

DICTYONEMA PERGRACILIS Hall. See *Desmograptus pergracilis*.

***Dictyonema pertenuae* Foerste.**

Dictyonema pertenuae Foerste, Bull. Sci. Lab. Denison Univ., 2, pt. 1, 1887, p. 107, pl. 8, fig. 27a, b; Geol. Surv. Ohio, Pal., 7, 1893, p. 600, pl. 27, figs. 27a, b.—Gurley, Jour. Geol., 4, 1896, p. 308.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 153, figs. 59, 60.

Upper Medinan (Brassfield): Soldiers Home near Dayton, Ohio.

***Dictyonema polymorphum* Gurley.**

Dictyonema tenellum Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, pl. 1, fig. 13 (not description, p. 576); Bull. Mus. Univ. State Missouri, 1, 1884, pl. 1, fig. 13 (not description, p. 26).

Dictyonema polymorphum—Continued.

Calyptograptus subretiformis Spencer (part), Trans. Acad. Sci. St. Louis, 4, 1884, pl. 4, fig. 2; Bull. Mus. Univ. State Missouri, 1, 1884, pl. 4, fig. 2.

Dictyonema polymorphum (Gurley MS.) Ruedemann, Mem. New York State Mus., 11, 1908, p. 158, pl. 2, fig. 3; pl. 3, figs. 4, 5, 6; p. 160, figs. 60-72.—Bassler, Bull. U. S. Nat. Mus., No. 65, 1909, p. 24, pl. 4, fig. 11.

Niagaran: Hamilton, Ontario; Middleport, New York (Rochester).

Holotype.—Cat. No. 54278, U.S.N.M.

Dictyonema quadrangulare (Hall).

Dictyonema quadrangulare Hall, Geol. Surv. Canada, dec. 2, 1865, p. 138, pl. 20, fig. 5.—Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 96.

Canadian: Point Levis, Quebec (Levis, *Clonograptus* zone); St. John, New Brunswick (Bretonian—Div. C3d).

Dictyonema rectilineatum Ruedemann.

Dictyonema n. sp. Ruedemann, New York State Pal. Ann. Rep., 1902, p. 570.

Dictyonema rectilineatum Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 607-609, pl. 3, figs. 9, 10, text fig. 29.

Canadian: Deepkill, Rensselaer County, New York (*Deepkill*, *Diplograptus dentatus* zone); Point Levis, Quebec (Levis, *dentatus* zone).

Dictyonema retiforme (Hall).

Gorgonia? *reteformis* Hall, Rep. Surv. 4th Geol. Dist. New York, 1843, p. 114, fig. 1.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1839, p. 260, figs.

Dictyonema retiformis Hall, Pal. New York, 2, 1852, p. 174, pl. 40F, fig. 1a, b.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 55, pl. 7, fig. 1.—Hall, Geol. Surv. Canada, dec. 2, 1865, p. 12, fig. 10; 20th Rep. New York State Cab. Hist., 1868, p. 178, fig. 11; rev. ed., 1870, p. 210, fig. 11; p. 225.—Nicholson, Mon. British Grapt., 1872, p. 129, fig. 69.—Zittel, Handb. Pal., 1, 1879, p. 289, fig. 195.—Spencer, Bull. Mus. Univ. State Missouri, 1, 1884, p. 14, 23, 24, pl. 3, figs. 1, 1a, 2, 2a; Trans. Acad. Sci. St. Louis, 4, 1884, p. 573, pl. 3, fig. 1, 2.—Miller, N. A. Geol. Pal., 1889, p. 185, text fig. 163.—Pocta, Syst. Sil. Centre Boheme, 8, 1894, p. 192, 193.—Gurley, Jour. Geol., 4, 1896, pp. 96, 308.—Roemer and Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 575, fig. 145.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 133, fig. 27; Bull. New York State Mus., 45, 1901, pp. 133, 134, fig. 27.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 25, fig. 33.—Ruedemann, Mem. New York State Mus., 11, 1908, p. 155, fig. 64, pl. 3, fig. 1.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 18, 19, figs. 19, 20.

Clinton (Rochester): Rochester, Lockport, etc., New York; Hamilton, Ontario.

Dictyonema robustum Hall.

Dictyonema robusta Hall, Geol. Surv. Canada, dec. 2, 1865, p. 137, pl. 20, figs. 3, 4.

Canadian (Levis, *Clonograptus* zone): Point Levis, Quebec.

Dictyonema scalariforme Foerste.

Dictyonema scalariforme Foerste, Bull. Sci. Lab. Denison Univ., 2, pt. 1, 1887, p. 108, pl. 8, figs. 28, 29; Geol. Surv. Ohio, Pal., 7, 1893, p. 600, pl. 27, figs. 28, 29.—Gurley, Jour. Geol., 4, 1896, p. 308.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 153, pl. 1, fig. 3, text figs. 61-63.

Upper Medinan (Brassfield): Soldiers Home, Dayton, Ohio.

Clinton shale: Near Clinton, New York.

DICTYONEMA SOCIALE Salter. See *Dictyonema flabelliforme*.

Dictyonema spenceri Gurley.

Dictyonema spenceri (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 36, 37, pl. 4, fig. 1, text fig. 46.

Niagaran dolomite: Hamilton, Ontario.

Dictyonema spiniferum Ruedemann.

Dictyonema spiniferum Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 151, pl. 1, fig. 4, text figs. 55, 56.

Chazyan (Normanskill): Glenmont, Albany County, New York.

Dictyonema splendens Billings.

Dictyonema splendens Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 12, fig. 2, 2a.—Spencer, Bull. Mus. Univ. State Missouri, 1, 1884, p. 27; Trans. Acad. Sci. St. Louis, 4, 1884, p. 577.—Foerste, Bull. Sci. Lab. Denison Univ., 2, pt. 1, 1887, p. 108.

Dictyonema cf. *splendens* Clarke, Mem. New York State Mus., 3, 1900, p. 64.

Silurian or Helderbergian: Between Cape Gaspe and Cape Rosier, Canada.

Dictyonema stenactinotum Gurley.

Dictyonema stenactinotum (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 30, 31, pl. 3, fig. 2, text fig. 34.

Niagaran dolomite: Hamilton, Ontario.

Dictyonema subretiforme (Spencer).

Calyptograptus subretiformis Spencer, Canadian Nat., n. s., 8, 1880, pp. 458, 460; *ibid.*, 10, 1882, p. 165; Bull. Mus. Univ. State Missouri, 1, 1884, p. 28, pl. 4, fig. 1 (not fig. 2); Trans. Acad. Sci. St. Louis, 4, 1884, p. 578, pl. 4, fig. 1 (not fig. 2).—Gurley, Jour. Geol., 4, 1896, pp. 93, 308.

Dictyonema subretiforme Ruedemann, Mem. New York State Mus., 11, 1908, p. 162, pl. 2, figs. 1, 2.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 26–28, figs. 30, 31.

Niagaran: Hamilton, Ontario; Middleport, New York (Rochester).

DICTYONEMA TENELLUM Spencer (part). See *Dictyonema polymorphum*.

Dictyonema tenellum Spencer.

Dictyonema tenellum Spencer, Canadian Nat., n. s., 8, 1878, pp. 458, 459; *ibid.*, 10, 1882, p. 165; Trans. Acad. Sci. St. Louis, 4, 1884, pp. 564, 576 (not pl. 1, fig. 13); Bull. Mus. Univ. State Missouri, 1, 1884, pp. 14, 26 (not pl. 1, fig. 13).—Miller, N. A. Geol. Pal., 1889, p. 185.—Gurley, Jour. Geol., 4, 1896, pp. 96, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 28–30, pl. 2, fig. 4, text figs. 32, 33.

Niagaran dolomite: Hamilton, Ontario.

Dictyonema websteri Dawson.

Dictyonema websteri Dawson, Acadian Geol., Suppl. Chap., 1860, p. 60, fig. 46; *ibid.*, 2d ed., 1868, p. 563, fig. 196; Canadian Nat. Geol., 5, 1860, p. 139, fig. 2—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 225.—Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 576; Bull. Mus. Univ. State Missouri, 1, 1884, p. 26.—Ruedemann, Proc. and Trans. Nova Scotian Inst. Sci., 11, pt. 4, 1908, p. xlvii.

Silurian: Kings County, Nova Scotia.

DICTYOPHYTON BECKI Miller. See *Lithodictyon becki*.

Dictyophytra Rauff.

Not recognized.

Dictyophytra (? in place of *Dictyophyton*) Rauff, Palaeontographica, 40, 1894, p. 249.

Observation.—*Dictyophytra* was proposed by Rauff probably to replace *Dictyophyton*, but its description was not given.

DICTYOPHYTREA? WALCOTTI Rauff. See *Cyathophycus walcotti*.

DICTYORHABDUS Walcott. Genotype: *D. priscus* Walcott.
Dictyorhabdus Walcott, Bull. Geol. Soc. Amer., 3, 1892, p. 165.

Dictyorhabdus priscus Walcott.
Dictyorhabdus priscus Walcott, Bull. Geol. Soc. Amer., 3, 1892, p. 165, pl. 3, figs. 1-5.
 Black River (Harding): Canon City, Colorado.

DICTYOSTOMA Spencer. See *Dictyostroma* Nicholson.

DICTYOSTOMA RETICULATUM Spencer. See *Ceramoporella reticulata*.

DICTYOSTROMA Nicholson. Genotype: *D. undulatum* Nicholson.
Dictyostroma Nicholson, Pal. Ohio, 2, 1875, p. 254.—Nicholson and Murie, Jour. Linn. Soc. London, Zool., 14, p. 224.—Zittel, Handb. Pal., 1, 1879, p. 286.—Dawson, Quart. Jour. Geol. Soc. London, 35, 1879, p. 56.—Nicholson, Mon. British Strom., Pal. Soc., 1886, p. 85.—Waagen and Wentzel, Mem. Geol. Surv. Indica, Pal. Indica, 13th ser., 1, 1888, p. 944.—Miller, N. A. Geol. Pal., 1889, p. 158.—Parks, Univ. Toronto Studies, Geol. Ser., 5, 1908, p. 56.
Dictyostroma Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 601; Bull. Mus. Univ. State Missouri, 1, 1884, p. 51.
Milleria Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, expl. of pl. 46 (Genotype: *M. laminata* Davis).
 Observation.—*Dictyostroma* is not a stromatoporoid, but is a coral closely allied if not identical with *Cœnites*.

DICTYOSTROMA RETICULATUM Whiteaves. See *Ceramoporella reticulata*.

Dictyostroma undulatum Nicholson.

Dictyostroma undulatum Nicholson, Pal. Ohio, 2, 1875, p. 254, pl. 24, figs. 6, 6c.—Nicholson and Murie, Jour. Linn. Soc. Zool., 14, 1878, p. 224.—Miller, N. A. Geol. Pal., 1889, p. 158, fig. 101.—Nicholson, Mon. British Strom., 1892, pp. 85, 232.—Parks, Univ. Toronto Studies, Geol. Ser., 5, 1908, p. 57, pl. 14, figs. 3, 4; pl. 15, figs. 3, 4, 7, 8.
Alveolites stromatoporoides Rominger, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 55.
Milleria laminata Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 46, fig. 9.
 Niagaran (Louisville): Louisville, Kentucky.

DIDYMOGRAPUS Pictet. See *Didymograptus* McCoy.

DIDYMOGRAPUS CADUCEUS Salter. See *Tetragraptus serra* and *T. similis*.

DIDYMOGRAPUS CONVEXUS Gurley. See *Didymograptus sagittarius*.

DIDYMOGRAPUS DIVARICATUS. See *Dicellograptus divaricatus*.

DIDYMOGRAPUS GEMINUS Nicholson. See *Didymograptus nanus*.

DIDYMOGRAPUS MURCHISONI FURCILLATUS Gurley. See *Didymograptus furcillatus*.

DIDYMOGRAPTUS McCoy. Genotype: *D. murchisoni* McCoy.
Didymograptus McCoy, British Pal. Fossils, pt. 2, 1851, p. 9.—Chapman, Canadian Jour., n. s., 1, 1856, p. 389.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 474.—Nicholson, Quart. Jour. Geol. Soc. London, 24, 1868, p. 9, 138.—Carruthers, Geol. Mag., 5, 1868, pp. 73, 128.—Nicholson, Ann. Mag. Nat. Hist., 4th ser., 5, 1870, p. 337; Mon. British Grapt., 1872, p. 103.

DIDYMOGRAPTUS—Continued.

Didymograptus Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, pp. 217, 234; rev. ed. (1870), p. 251.—Zittel, Handb. Pal., 1, 1879, p. 298.—Tullberg, Sveriges Geol. Unders., ser. C, No. 55, 1883, p. 12.—Hermann, Geol. Mag., dec. 3, 3, 1886, p. 14.—Miller, N. A. Geol. Pal., 1889, p. 185.—Tornquist, Lunds Univers. Årsskrift, 26, No. 4, 1890, p. 15.—Barrois, Ann. Soc. Geol. du Nord, 21, Lille, 1893, p. 108.—Holm, Sveriges Geol. Unders., ser. C, No. 150, 1895, p. 15; Geol. Foren. Stockholm Förhandl., 17, 1895, p. 331; Geol. Mag., dec. 4, 2, 1895, pp. 433, 439, pl. 14, figs. 1-3, 7, 8.—Nicholson and Murie, Geol. Mag., dec. 4, 2, 1895, pp. 530-535, figs.—Koken, Die Leitfossilien, Leipzig, 1896, p. 328.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, No. 4, 1896, p. 266; Nat. Sci., 9, 1896, p. 191.—Walther, Zeits. d. d. geol. Gesell., 49, 1897, p. 251.—Roemer and Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 587.—Ruedemann, Amer. Nat., 32, 1898, p. 5; Zittel-Eastman Textb. Pal., 1, 1900, p. 118.—Tornquist, Lunds Univers. Årsskrift, 37, No. 5, 1901, p. 10.—Elles and Wood, Mon. British Grapt., Pal. Soc., 1901, p. 5.—Ruedemann, Mem. New York State Mus., 7, 1904, p. 666, 668.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 30.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 247; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 129.

Didymograptus acutidens Lapworth.

Didymograptus affinis Hopkinson, Quart. Jour. Geol. Soc., 31, 1875, pl. 33, figs. 6b, c.

Didymograptus acutidens (Lapworth MS.) Elles and Wood, Mon. British Grapt., pt. 1, Pal. Soc., 1901, p. 25, pl. 2, figs. 3a-d.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 683, 684, pl. 13, fig. 15, text figs. 77, 78.

Canadian: St. Davids District, Wales, and South Shropshire, England (Arenig); Deepkill, Rensselaer County, New York (Deepkill, *Didymograptus bifidus* zone).

DIDYMOGRAPTUS AFFINIS Hopkinson. See *Didymograptus acutidens*.

Didymograptus arcuatus (Hall).

Graptolithus arcuatus Hall, Geol. Surv. Canada, dec. 2, 1865, p. 79, pl. 2, figs. 6-10.

Graptolithus (Monoprion) *arcuatus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 226; rev. ed. (1870), p. 260; p. 223.

Didymograptus arcuatus Gurley, Jour. Geol., 4, 1896, p. 96 (gen. ref.).

Didymograptus arcuatus Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. li (gen. ref.).

Canadian (Levis, *Didymograptus* zone): Point Levis, Quebec.

Didymograptus bifidus (Hall).

Graptolithus bifidus Hall, Canadian Nat. and Geol., 3, 1858, p. 164; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 130; Geol. Surv. Canada, dec. 2, 1865, p. 73, pl. 1, figs. 16-18; pl. 3, figs. 9, 10.

Graptolithus (Monoprion) *bifidus* Hall, 20th Rep. New York State Cab. Nat. Hist. 1869, p. 226, pl. 3, figs. 13, 14; rev. ed., 1870, p. 241; p. 223.

Didymograptus bifidus Nicholson, Quart. Jour. Geol. Soc. London, 24, 1868, p. 136; Ann. Mag. Nat. Hist., 4th ser., 5, p. 346, fig. 7.—Hopkinson, Quart. Jour. Geol. Soc., 31, 1875, p. 646, pl. 33, figs. 8a-e.—Brögger, Die sil. Etagen 2, 3, etc. Kristiania, 1882, p. 41.—Herrmann, Geol. Mag., 3d ser., 3, 1886, p. 15.—Ami, Geol. Surv. Canada Rep., 2d ser., 3, pt. 2, 1889, p. 116k.—Barrois, Ann. de la Soc. Geol. du Nord., 20, 1892, p. 92.—Elles, Quart. Jour. Geol. Soc. London, 54, 1898, p. 511.—Elles and Wood, Mon. British Grapt., pt. 1, Pal.

Didymograptus bifidus—Continued.

Soc., 1901, p. 42, figs. 26a-b, pl. 4, figs. 1a-f; p. 6, figs. 1, 2.—Ruedemann, New York State Pal. Ann. Rep., 1902, pp. 566, 567; Mem. New York State Mus., 7, pt. 1, 1904, pp. 689-692, pl. 15, figs. 1-3, text figs. 86, 87.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 31, fig. 47c, 48.

Canadian: Point Levis, Quebec (Levis, *Didymograptus bifidus* zone); Deepkill, Rensselaer County, New York (Deepkill, *D. bifidus* zone); Nevada; South Scotland and Wales (Arenig); England; Scandinavia; Bohemia; France.

Didymograptus bipunctatus (Gurley).

Didymograptus bipunctatus Gurley, Jour. Geol., 4, 1896, p. 65, pl. 5, figs. 7, 7a. Canadian (Levis): Near Point Levis, Quebec.

DIDYMOGRAPTUS CADUCEUS of authors. See *Tetragraptus similis*, *Didymograptus* (*Isograptus*) *caduceus* and *T. similis*.

Didymograptus (Isograptus) caduceus (Salter).

Didymograptus caduceus Salter (part), Quart. Jour. Geol. Soc. London, 9, 1853, p. 87, fig. 1a; *ibid.*, 19, 1863, p. 138, fig. 13a.

Graptolithus caduceus Chapman, Canadian Jour., n. s., 1, 1856, p. 390, fig. 3.

Graptolites (Didymograptus) caduceus McCoy, Pal. Geol. Surv. Victoria, Prodr. Pal. Victoria, dec. 2, 1874, p. 30, pl. 20, figs. 3-5a.

Didymograptus caduceus T. S. Hall, Proc. Royal Soc. Victoria, n. s., 8, 1896, p. 69.

Didymograptus (Isograptus) caduceus Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 693-698, pl. 15, figs. 6, 7, text fig. 89.

Tetragraptus caduceus Brögger, Die Sil. Etagen 2, 3, Kristiania, 1882, p. 39.

Didymograptus gibberulus Nicholson, Ann. Mag. Nat. Hist., 4th ser., 16, 1875, p. 271, pl. 7, figs. 3, 3a, 3b.—Moberg, Geol. Foren. Stockh. Forh., 13, 1891, p. 221.—Holm, Sver. Geol. Und. Afh. och upps., ser. C, No. 150, 1895, p. 18.—Elles, Quart. Jour. Geol. Soc., 54, 1898, p. 496.—Elles and Wood, Mon. British Grapt., pt. 1, Pal. Soc., 1901, p. 52, figs. 33a, b; pl. 2, figs. 9a-e.

Didymograptus (Isograptus) gibberulus Roemer and Frech, Leth. Pal., 1, 1897, p. 93, fig. 161.

Isograptus gibberulus Moberg, Geol. Foren. Stockh. Forh., 14, 1892, p. 346, pl. 8, figs. 3-7.—Törnquist, Lunds Univ. Årsskrift, 37, Afd. 2, 1901, p. 23, pl. 3, figs. 16-19.

Tetragraptus bryonoides Etheridge, jr., Ann. Mag. Nat. Hist., 4th ser., 1874, 14, p. 2, pl. 3, figs. 3, 4.

Phyllograptus stella Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 658, pl. 34, fig. 6.

Lower Ordovician: England (Skiddaw); Wales (Arenig); Scandinavia; Australia; Deepkill, Rensselaer County, New York (Deepkill, *Didymograptus bifidus* zone); Point Levis, Quebec (Levis, *Diplograptus dentatus* zone); Arkansas.

Didymograptus caduceus nanus Ruedemann.

Didymograptus caduceus nanus Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, p. 698, pl. 15, figs. 8, 9, text fig. 90.

Canadian: Deepkill, Rensselaer County, New York (Deepkill, *Diplograptus dentatus* zone); Point Levis, Quebec (Levis, *D. dentatus* zone); Arkansas.

Didymograptus cuspidatus Ruedemann.

Didymograptus cuspidatus Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 684, 685, pl. 13, fig. 16, text figs. 79, 80.

Canadian (Deepkill, *Diplograptus dentatus* zone): Mt. Moreno, Columbia County, New York.

DIDYMOGRAPTUS DIVARICATUS Nicholson. See *Dicellograptus divaricatus*.

DIDYMOGRAPTUS? ELEGANS Ruedemann. See *Monograptus elegans*.

Didymograptus ellesæ Ruedemann.

Didymograptus (*Leptograptus*) (part.) Ruedemann, New York State Pal. Ann. Rep., 1902, p. 589.

Didymograptus ellesæ Ruedemann, Mem. New York State Mus., 7, 1904, pt. 1, pp. 682, 683, pl. 14, figs. 22-24, text figs. 75, 76. (Corrected to *ellesæ* in 1906, Mem. 11, pt. 2, p. 134.)

Canadian (*Deepkill*, *Didymograptus bifidus* zone): *Deepkill*, Rensselaer County, New York.

Didymograptus euodus Lapworth.

Didymograptus euodus Lapworth, Quart. Jour. Geol. Soc. London, 31, 1875, p. 645, pl. 35, fig. 1a-c.—Elles and Wood, Mon. British Grapt., pt. 1, Pal. Soc., p. 21, pl. 1, figs. 10a, b.

Ordovician (Lower *Llandeilo*): *Abereiddy Bay*, St. David's District, Wales.

Canadian (Upper *Tetragraptus* zone): Twelve miles west of *Little Rock*, Arkansas.

Didymograptus extensus (Hall).

Graptolithus extensus Hall, Geol. Surv. Can. Rep., 1858, p. 132; Canadian Nat. Geol., 3, 1858, p. 166; Geol. Surv. Canada, dec. 2, p. 80, pl. 2, figs. 11-16.

Graptolithus (*Monoprion*) *extensus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 195, pl. 3, fig. 12; rev. ed., 1870, p. 225, pl. 3, fig. 12, p. 228.

Didymograptus extensus Nicholson, Ann. Mag. Nat. Hist., 4th ser., v. 1870, 5, 341, pl. 7, figs. 2, 2a.—Hopkinson, Quart. Jour. Geol. Soc., 31, 1875, p. 642, pl. 33, figs. 1a-1d.—Brøgger, Die Sil. Etagen 2, 3, 1882, p. 40, Kristiania.—Herrmann, Geol. Mag., dec. 3, 3, 1886, p. 14.—Lapworth, Proc. and Trans. Roy. Soc. Can., 4, 1887, pp. 168, 184.—Ami, Geol. Sur. Can. Rep., 2d ser., 3, pt. 2, 1889, p. 116k.—Roemer and Frech, Leth. Pal., 1, 1897, p. 591.—Elles, Quart. Jour. Geol. Soc., London, 54, 1898, p. 504.—Törnquist, Lunds Univ. Årsskrift, 37, Af. 2, Nr. 5, 1901, p. 14, pl. 1, figs. 25-30.—Elles and Wood, Mon. British Grapt., pt. 1, Pal. Soc., 1901, p. 8, pl. 1, figs. 1a, b., text figs. 4a-d.—Ruedemann, New York State Pal., Ann. Rep., 1902, p. 556; Mem. New York State Mus., 7, pt. 1, 1904, pp. 668-671, pl. 13, figs. 17, 18; pl. 14, figs. 1-4; text figs. 62-65.

Didymograpsus extensus Gurley, Jour. Geol., 4, 1896, p. 96 (gen. ref.).

Graptolites (*Didymograptus*) *extensus* McCoy, Geol. Surv. Victoria, Prodr. Pal., dec. 2, 1875, p. 29, pl. 20, figs. 1, 1a.

Graptolithus constrictus Hall (part), Geol. Surv. Canada, Can. Org. Rem., dec. 2, 1865, p. 76, pl. 1, figs. 23-27.

Canadian: *Point Levis*, Quebec (*Levis*, *Didymograptus* zone); *Deepkill*, Rensselaer County, New York (*Deepkill*, *Tetragraptus* zone); Arkansas; South Scotland; Wales (*Arenig*); Wales (*Skiddaw*); Christiania; Scania; Australia.

Didymograptus extenuatus (Hall).

Graptolithus extenuatus Hall, Geol. Surv. Canada, dec. 2, 1865, p. 75, pl. 1, figs. 21, 22.

Graptolithus (*Monoprion*) *extenuatus* Hall, 20th Rep. New York State Cab. Hist., 1868, p. 226; rev. ed., 1870, p. 241.

Didymograpsus extenuatus Gurley, Jour. Geol., 4, 1896, p. 96 (gen. ref.).

Didymograptus extenuatus Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. li (gen. ref.).

Canadian (*Levis*, *Diplograptus dentatus* zone): *Point Levis*, Quebec.

Didymograptus filiformis Tullberg.

Didymograptus filiformis Tullberg, Geol. Fören. Stockh. Forh., 5, 1880, 42, pl. 2, figs. 8-11.—Lapworth, Ann. Mag. Nat. Hist., 5th ser., 6, 1880, p. 20.—Brögger, Die sil. Etagen 2, 3, 1882, p. 39.—Tullberg, Sver. Geol. Und., Afh. och upps. ser. C, 50, 1882, p. 22.—Törnquist, Lunds Univ. Arskrift, 37, Af. 2, nr. 5, 1901, pl. 3, figs. 6-9.—Elles and Wood, Mon. British Grapt., pt. 1, Pal. Soc., 1901, p. 32, fig. 20.—Ruedemann New York State Pal., Ann. Rep., 1902, p. 556; Mem. New York State Mus., 7, pt. 1, 1904, pp. 686, 687, pl. 14, figs. 8-14.

Lower Ordovician: Scania, Westrogothia; Norway; Scotland (Arenig); Deepkill, Rensselaer County, and Mount Moreno, near Hudson, New York (Deepkill, Tetragraptus and Diplograptus dentatus zones).

Didymograptus forcipiformis Ruedemann.

Didymograptus forcipiformis Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 699, 700, pl. 15, figs. 10-13; text fig. 91.

Canadian: Mount Moreno, Columbia County, New York (Deepkill, Diplograptus dentatus zone); Point Levis, Quebec (Levis, D. dentatus zone).

DIDYMOGRAPTUS FRUTICOSUS Etheridge. See *Tetragraptus fruticosus*.

Didymograptus furcillatus Lapworth.

Didymograptus furcillatus Lapworth, Quar. Jour. Geol. Soc. London, 31, 1875, p. 649, pl. 35, figs. 3a-3d.

Didymograptus murchisoni furcillatus Gurley, Jour. Geol., 4, 1897, p. 97.

Ordovician: Wales (Lower Llandeilo): Point Levis, Quebec (Levis).

DIDYMOGRAPTUS GIBBERULUS Nicholson. See *Didymograptus (Isograptus) caduceus*.

Didymograptus gracilis Törnquist.

Didymograptus gracilis Törnquist, Under. ofver. Siljans. Graptoliter 1 (Aftryck ur Lunds Univ. Arskrift. 26), 1891, p. 17, pl. 1, figs. 9-12.—Holm, Geol. Fören. Stockh. Forh. 17, H 3, 1895, pl. 1, figs. 7, 8.—Elles, Quar. Jour. Geol. Soc., 54, 1895, p. 506.—Elles and Wood, Mon. British Grapt., pt. 1, 1901, p. 24, pl. 2, fig. 2.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 679-681, figs. 15-21, pl. 14.

Didymograptus (Leptograptus) gracilis Ruedemann, New York State Pal., Ann. Rep., 1902, p. 589, fig. 17.

Lower Ordovician: Dalarne, Sweden (Phyllograptus shalee); England (Skiddaw); Deepkill, Rensselaer County, etc., New York (Deepkill, *Didymograptus bifidus* zone).

Didymograptus incertus Ruedemann.

Didymograptus sp. nov. Ruedemann, New York State Pal., Ann. Rep., 1902, p. 570.

Didymograptus incertus Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 700, 701, pl. 15, fig. 14, text fig. 92.

Canadian (Deepkill, *Diplograptus dentatus* zone): Deepkill, Rensselaer County, New York.

Didymograptus indentus (Hall).

Graptolithus indentus Hall, Canadian Nat. Geol., 3, 1858, p. 163; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 128; Geol. Surv. Canada, dec. 2, 1865, p. 74, pl. 1, fig. 20.

Graptolithus (Monoprion) indentus Hall, 20th Rep. New York State Cab. Hist., 1868, p. 226; rev. ed., 1870, p. 260; p. 223.

Didymograptus indentus—Continued.

Didymograptus indentus Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 647, pl. 33, figs. 7a–7c.—Barrois, Ann. Soc. Geol. du Nord, 20, 1892, p. 93.—Matthew, Trans. Royal Soc. Canada, 10, sec. 4, 1893, p. 99.—Elles, Quart. Jour. Geol. Soc. London, 54, 1898, p. 510.

Canadian: Point Levis, Quebec (Levis, *Didymograptus* zone); St. John, New Brunswick (Bretonian—Div. C3d); Wales (Skiddaw).

DIDYMOGRAPTUS INDENTUS var. **NANUS** Lapworth. See *Didymograptus nanus*.

Didymograptus nanus (Lapworth).

Didymograptus geminus Nicholson, Quar. Jour. Geol. Soc., 24, 1868, p. 134, pl. 5, figs. 8, 9; Ann. and Mag. Nat. Hist., ser. 4, 5, 1870, p. 346, fig. 6b.

Didymograptus indentus var. *nanus* Lapworth, Quar. Jour. Geol. Soc., 31, 1875, p. 647, pl. 33, fig. 7d; pl. 35, figs. 4a–c.—Elles, Quar. Jour. Geol. Soc., 54, 1898, p. 511.

Didymograptus nanus Elles and Wood, Mon. British Grapt. pt. 1, Pal. Soc., 1901, p. 47, pl. 4, figs. 5a–h.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 692, 693, pl. 15, figs. 4, 5; text fig. 88.

Lower Ordovician: Wales (Arenig); England (Skiddaw); Deepkill, Rensselaer County, New York (Deepkill, *Didymograptus bifidus* zone).

Didymograptus nicholsoni planus Elles and Wood.

Didymograptus nicholsoni var. *planus* Elles and Wood, Mon. British Grapt., pt. 1, Pal. Soc., 1901, p. 29, pl. 2, figs. 5a, b.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 685, 686, pl. 13, figs. 10–14, text figs. 82, 83.

Lower Ordovician: England (Skiddaw); Deepkill, Rensselaer County, New York (Deepkill, *Tetragraptus* zone).

Didymograptus nitidus (Hall).

Graptolithus nitidus Hall, Geol. Surv. Canada Rep., 1857, 1858, p. 129; Can. Nat. and Geol., 3, 1858, p. 163; Canadian Org. Rem., dec. 2, 1865, p. 69, pl. 1, figs. 1–9.

Graptolithus (Monoprion) *nitidus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 226, pl. 3, figs. 8, 9; rev. ed., 1870, p. 234, pl. 3, figs. 8, 9, p. 223.

Didymograptus nitidus Nicholson (part.), Quar. Jour. Geol. Soc. London, 24, 1868, p. 135.—Etheridge, jr., Ann. Mag. Nat. Hist., 4th ser., 14, 1874, 6, pl. 3, fig. 20.—Herrmann, Geol. Mag., dec. 3, 3, 1886, p. 15.—Barrois, Ann. de la Soc. Geol. du Nord, 1892, 20, p. 91.—Matthew, Trans. Roy. Soc. Can., 10, sec. 4, 1893, p. 98.—Elles (part.), Quar. Jour. Geol. Soc., 54, 1896, 499–502; p. 500, fig. 19; p. 501, fig. 20.—Roemer and Frech, Leth. Geog., 1, Theil, Leth. Pal., 1, Lief., 3, 1897, p. 591, fig. 160.—Elles, Quart. Jour. Geol. Soc. London, 54, 1898, p. 499, figs. 19, 20, p. 500.—Elles and Wood, Mon. British Grapt., pt. 1, Pal. Soc., 1901, p. 10, pl. 1, figs. 2a–c, figs. 5a–d.—Ruedemann, New York State Pal. Ann. Rep., 1902, p. 554, 556; Mem. New York State Mus., 7, pt. 1, 1904, pp. 671–674, pl. 13, figs. 1–4; pl. 14, figs. 5, 6, text figs. 66–70.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 31, fig. 47a, 49a.—Hoek, Neues Jahrb. Min. Geol. Pal., 34, 1912, p. 220, pl. 13, figs. 8, 9.

Didymograptus (*Graptolithus*) *nitidus* Nicholson, Mon. British Grapt., 1872, p. 80, fig. 45.

Canadian: Point Levis, Quebec (Levis, *Didymograptus* zone); St. John, New Brunswick (Bretonian—Div. C3d); Deepkill, Rensselaer County, New York (Deepkill, *Tetragraptus* zone); Arkansas; England (Skiddaw); France; Australia; Norway; Argentina.

Didymograptus nitidus grandis Ruedemann.

Didymograptus nitidus var. *grandis* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, p. 674, pl. 13, fig. 5.

Canadian (Deepkill, *Tetraraptus* zone): Deepkill, Rensselaer County New York.

Didymograptus patulus (Hall).

Graptolithus patulus Hall, Geol. Surv. Can., Rep. for 1857, 1858, p. 131; Can. Nat. and Geol., 3, 1858, p. 165; Geol. Surv. Canada, Canadian Org. Rem., dec. 2, 1865, p. 71, pl. 1, figs. 10-15.

Didymograptus patulus Hopkinson, Quar. Jour. Geol. Soc., 31, 1875, 644, pl. 33, figs. 4a-e.—Linnarsson, Sver. Geol. Und. Afh. och Uppsa., ser. C, No. 31, 1879, p. 5.—Brögger, Die sil. Etagen 2, 3, Kristiania, 1882, p. 39.—Herrmann (part.), Geol. Mag., dec. 3, 3, 1886, p. 14.—Matthew, Proc. and Trans. Royal Soc. Can., 10, sec. 4, 1893, p. 98; *ibid.*, 11, 1894, p. 114.—Elles and Wood, Mon. British Grapt., pt. 1, Pal. Soc., 1901, p. 13, pl. 1, figs. 8a-c; text figs. 8a-b.—Ruedemann, New York State Pal. Ann. Rep., 1902, p. 556; Mem. New York State Mus., 7, pt. 1, 1904, pp. 674-676, pl. 13, figs. 8, 9; pl. 14, fig. 7; text figs. 71-73 (73 on p. 677).—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 31, figs. 47b, 49b.

Canadian: Point Levis, Quebec (Levis); St. John, New Brunswick (Bretonian—Div. C3d); Deepkill, Rensselaer County, New York (Deepkill, *Tetraraptus* zone).

Didymograptus pennatulus (Hall).

Graptolithus pennatulus Hall, Geol. Surv. Canada, dec. 2, 1865, p. 7, fig. 1; p. 82, pl. 3, figs. 1-8; pl. 5, fig. 9.

Graptolithus (*Didymograptus*) *pennatulus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 173, fig. 2; rev. ed., 1870, p. 206, fig. 2.

Graptolithus (*Monoprion*) *pennatulus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 223.

Didymograptus pennatulus Hopkinson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 643, pl. 33, figs. 3a-3e.—Zittel, Handb. Pal., 1, 1879, p. 298, fig. 204.—Barrois, Ann. Soc. Geol. du Nord, 20, 1892, p. 90.—Elles and Wood, Mon. British Grapt., Pal. Soc., 1901, p. 18, pl. 1, fig. 7.

Didymograptus pennatulus Gurley, Jour. Geol., 4, 1896, p. 97 (gen. ref.).

Canadian: Point Levis, Quebec (Levis, *Didymograptus* zone); England (Arenig).

Didymograptus perflexus Gurley.

Didymograptus perflexus Gurley, Jour. Geol., 4, 1896, p. 66.

Canadian: Summit, Nevada.

Cotypes.—Cat. No. 54344, U.S.N.M.

DIDYMOGRAPTUS RECTUS Ruedemann. See *Monograptus rectus*.

DIDYMOGRAPTUS SAGITTARIUS Dale. See *Didymograptus sagitticaulis*.

Didymograptus sagitticaulis Gurley.

Graptolithus sagittarius Hall (not Hisinger), Pal. New York, 1, 1847, p. 272, pl. 74, fig. 1.—Chapman, Canadian Jour., n. s., 1, 1856, p. 390, fig. 6.—Walcott, Trans. Albany Inst., 10, 1883 (adv. sheet, 1879, p. 34).

Monograptus sagittarius Whitfield, Am. Jour. Sci., 3d ser., 26, 1883, p. 380.

Didymograptus sagittarius Lapworth, Trans. Roy. Soc. Canada, 5, sec. 4, 1886, p. 180f, 183f; Geol. Surv. Canada Ann. Rep., 2d ser., 3, pt. 1, 1889, p. 95B.—Walcott, Bull. Geol. Soc. Amer., 1, 1890, p. 338.—Gurley, Geol. Surv. Arkansas, Ann. Rep., 3, p. 411.—Dale, Bull. U. S. Geol. Surv., 242, 1904, p. 33.

Didymograptus sagitticaulis Gurley, Jour. Geol., 4, 1896, p. 68.

Didymograptus sagitticaulis—Continued.

- Didymograptus convexus* Gurley, Jour. Geol., 4, 1896, p. 67, pl. 5, fig. 8.
Didymograptus sagitticaulis Ruedemann, Mem. New York State Mus., 11, pt. 2-1908, pp. 248-251, pl. 14, fig. 3, text figs. 151-155.
 Chazyan (Normanskill): Kenwood, Stockport, and near Poughkeepsie, New York; Canada; Arkansas (Stringtown); Tennessee (Athens).
Plesiolytes.—Cat. No. 54255, U.S.N.M. (Gurley types of *D. convexus*.)

Didymograptus serratulus (Hall).

- Graptolithus serratulus* Hall, Pal. New York, 1, 1847, p. 274, pl. 74, fig. 5a, b.—Chapman, Canadian Jour., n. s., 1, 1856, p. 390, text fig. 8.—Hall, New York State Cab. Nat. Hist., 20th Rep., 1867, p. 223f.—Walcott, Trans. Albany Inst., 10, 1883, p. 35 (adv. sheets, 1879).
 ?*Graptolithus* (*Monograptus*) *serratulus* Whitfield, U. S. Geog. Surv., 100th Mer., Lieut. Wheeler's Rep., 4, 1877, p. 19.
Graptolithus (*Monoprion*) *serratulus* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 226; rev. ed., 1870, p. 260.
Didymograptus serratulus Walcott, Geol. Soc. Amer., Bull. 1, 1890, p. 338.—Gurley, Geol. Surv. Arkansas, Ann. Rep., 3, 1892, p. 411.—Roemer and Frech, Leth. Pal., 1, 1897, p. 589.—Ruedemann, Bull. New York State Mus., 42, 1901, pp. 497, 541.—Elles and Wood, Mon. British Grapt., pt. 1, 1901, p. 29, pl. 2, figs. 7a, b, text fig. 18a-b.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 251-253, pl. 14, fig. 4, text figs. 156-159.
Didymograptus serratulus Pictet, Traite de Pal., 2d ed., 4, 1857, p. 474, pl. 108, fig. 23.
 Middle Ordovician: Kenwood, Stockport, etc., New York; Arkansas (Normanskill); Great Britain (Glenkiln).

Didymograptus serratulus juvenalis Ruedemann.

- Didymograptus serratulus juvenalis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 252, fig. 156.
 Chazyan (Normanskill): Kenwood, New York.

Didymograptus sextans Nicholson. See *Dicellograptus sextans*.**Didymograptus similis** (Hall).

- Graptolithus similis* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 78, pl. 2, figs. 1-5.
Didymograptus similis Gurley, Jour. Geol., 4, 1896, p. 295 (gen. ref.).
Didymograptus similis Ruedemann, New York State Pal., Ann. Rep., 1902, pp. 566, 567; Mem. New York State Mus., 7, pt. 1, 1904, pp. 677-679, pl. 14, figs. 25-29, text figs. 73, 74 (73 on p. 678).
 Canadian: Point Levis, Quebec (Levis, *Didymograptus* zone); Deepkill, Rensselaer County, New York (Deepkill, *Didymograptus* and *Diplograptus* zones); Wales (Arenig); Norway; Sweden.

Didymograptus spinosus Ruedemann.

- Didymograptus spinosus* Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 688, 689, pl. 14, figs. 30-32, text figs. 84, 85.
 Canadian (Deepkill, *Diplograptus dentatus* zone): Mount Moreno, Columbia County, New York.

Didymograptus subtenuis (Hall).

- Graptolithus tenuis* (Portlock?) Hall, Pal. New York, 1, 1847, p. 272, pl. 74, figs. 2a-d.
Graptolithus subtenuis Hall, in Miller's Amer. Pal. Foss., 1st ed., 1877, p. 244.—Walcott, Trans. Albany Inst., 1883, 10 (adv. sheets, p. 35).—Gurley, Jour. Cincinnati Soc. Nat. Hist., 16, 1892, p. 156.

Didymograptus subtenuis—Continued.

Dicellograptus tenuis Lapworth, Roy. Soc. Canada Trans. 5, sec. 4, 1886, p. 178.

Leptograptus tenuis Lapworth, Roy. Soc. Canada Trans., 10, sec. 4, 1886, p. 183.

Leptograptus subtenuis Walcott, Bull. Geol. Soc. Amer., 1, 1890, p. 338.

Leptograptus subtenuis Gurley, Jour. Geol., 4, 1896, p. 296 (gen. ref.).

Didymograptus tenuis Ruedemann, Bull. New York State Mus., 42, 1901, p. 540.

Didymograptus subtenuis Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 253–255, pl. 14, figs. 1, 2, text figs. 160, 161.

Chazyan (Normanskill): Kenwood, Mount Moreno, and Stockport, New York; Canada.

Didymograptus superectes Lapworth.

Didymograptus superectes Lapworth, Cat. West. Scot. Foss., pl. 3, fig. 74, a, b; Proc. Belfast Field Club, 1877, p. 142, pl. 7, figs. 15a, b.—Elles and

Wood, Mon. British. Grapt., Pal. Soc., pt. 1, 1901, p. 19, pl. 1, figs. 9a, b.

Middle Ordovician: South Scotland (Glenkiln); Oklahoma (Normanskill-Stringtown).

DIDYMOGRAPTUS TENUIS Ruedemann. See *Didymograptus subtenuis*.

DIDYMOGRAPTUS (GONIOGRAPTUS) THUREAUI McCoy. See *Goniograptus thureaui*.

Didymograptus tornquisti Ruedemann.

Didymograptus tornquisti Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, p. 688, pl. 13, figs. 6, 7.

Canadian (Deepkill, *Didymograptus bifidus* zone): Deepkill, Rensselaer County, New York.

DIDYMOPORA Ulrich. See *Fistulipora* McCoy.

DIKELOCEPHALUS Owen.

Genotype: *D. minnesotensis* Owen.

Dikelocephalus Owen, Geol. Surv. Wisconsin, Iowa, Minnesota, 1852, p. 573.—

Billings, Canadian Nat. Geol., 5, 1860, p. 306.—Hall, 16th Ann. Rep. New

York State Cab. Nat. Hist., 1863, p. 137.—Billings, Pal. Foss., 1, Geol. Surv.

Canada, 1865, p. 399.—Chapman, Expos. Min., Geol. Canada, 1864, p. 137.—

Salter, Mem. Geol. Surv. Great Britain, 3, 1866, p. 303.—Hall, Trans. Albany

Inst., 5, 1867, p. 116.—Hall and Whitfield, U. S. Geol. Surv. Expl. 40th Parl.,

4, 1877, p. 225.—Salter, Mem. Geol. Surv. Great Britain, 3, 2d ed., 1881, p.

497.—Whitfield, Geol. Wisconsin, 4, 1882, p. 200.—Zittel, Handb. Pal., 2,

1885, p. 596.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, p. 192; Zittel-

Eastman Textb. Pal., 1, 1900, p. 629.—Raymond, *ibid.*, 2d ed., 1913, p. 720.

Dikelocephalus Dames, Richthofen's China, Berlin, 4, 1883, p. 5.—Koken, Die

Leitfossilien, Leipzig, 1896, p. 17, fig. 10, fig. 8.

Dikelocephalus Barrande, N. Jahrb. f. Min., 1853, p. 336.

Dicelloccephalus Whitfield, Ann. Rep. Wisconsin Geol. Surv., 1878, p. 63.—

Miller, N. A. Geol. Pal., 1889, p. 543.—Matthew, Trans. Royal Soc. Canada,

10, sec. 4, 1893, p. 10.—Berkey, Amer. Geol., 21, 1898, p. 290.

DIKELOCEPHALUS AFFINIS Billings. See *Platycolpus affinis*.

DIKELOCEPHALUS BARABUENSIS Whitfield. See *Platycolpus barabuensis*.

DIKELOCEPHALUS BELLI Billings. See *Anomocarella belli*.

DIKELOCEPHALUS CORAX Billings. See *Apatokephalus corax*.

DIKELOCEPHALUS CRISTATUS Billings. See *Conokephalina? cristatus*.

DIKELOCEPHALUS DEVINEI Billings. See *Ptychoparia? devinei*.

DIKELOCEPHALUS EATONI Whitfield. See *Platycolpus eatoni*.

DIKELOCEPHALUS HARTII Walcott (1909). See *Saukia stoesi*.

Dikelocephalus hartti (Walcott).

Conocephalites Hartti Walcott, 32d Rep. New York State Mus. Nat. Hist., 1880, p. 130.

Dicelloccephalus hartti Walcott, Bull. U. S. Geol. Surv., 30, 1886, p. 21.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 199, figs.—Walcott, Smiths. Misc. Coll., 57, 1912, p. 273, pl. 44, figs. 1-7a.

Dikelocephalus hartti Walcott, Smiths. Misc. Coll., 57, No. 13, 1914, p. 368, pl. 63, figs. 1-7, 7a.

Ozarkian or Upper Cambrian: Near Saratoga Springs (Hoyt), and near Chateaugay, New York (top of Potsdam).

Cotypes.—Cat. Nos. 58571-58577, U.S.N.M.

DIKELOCEPHALUS HISINGERI Billings. See *Lisania? hisingeri*.

DIKELOCEPHALUS MAGNIFICUS Billings. See *Hungaia magnifica*.

DIKELOCEPHALUS MEGALOPS Billings. See *Conocephalina megalops*.

Dikelocephalus? missisquoi Billings.

Dikelocephalus Missisquoi Billings, Pal. Foss., Geol. Surv. Canada, 1865, p. 199. Canadian (Beekmantown): Philipsburg, Quebec.

DIKELOCEPHALUS NEWTONENSIS Weller. See *Calvinella newtonensis*.

DIKELOCEPHALUS OWENI Billings. See *Anomocarella? oweni*.

DIKELOCEPHALUS PAUPER Billings. See *Ptychoparia? pauper*.

DIKELOCEPHALUS PLANIFRONS Billings. See *Anomocarella? planifrons*.

DIKELOCEPHALUS SELECTUS Billings. See *Ptychaspis? selectus*.

DIKELOCEPHALUS SESOSTRIS Billings. See *Ptychaspis sesostris*.

Dikelocephalus tribullis (Walcott).

Dicelloccephalus tribullis Walcott, Smiths. Misc. Coll., 57, 1912, p. 274, pl. 44, figs. 8, 8a.

Dikelocephalus tribullis Walcott, Smiths. Misc. Coll., 57, 1914, p. 372, pl. 63, figs. 8-10, 10a.

Ozarkian or Upper Cambrian (Hoyt): Near Saratoga Springs, New York.

Holotype.—Cat. No. 58578, U.S.N.M.

DILOBELLA Ulrich.

Genotype: *D. typa* Ulrich.

Dilobella Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 672.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 347.

Dilobella typa Ulrich.

Dilobella typa Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 673, pl. 46, figs. 30-34.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 348, fig. 1658s, s', t.—Basler, Zittel-Eastman Textb. Pal., 1913, p. 738, fig. 1425p.

Bollia typa Miller, N. A. Geol. Pal., 2d App., 1897, p. 787 (gen. ref.).

Black River (Decorah): St. Paul and Cannon Falls, Minnesota.

Cotypes.—Cat. No. 41641, U.S.N.M.

DIMEROCRINITES Phillips. See *Dimerocrinus* Phillips.

DIMEROCRINUS Phillips.Genotype: *D. decadactylus* Phillips.

Dimerocrinites Phillips, in Murchison's *Sil. Syst.*, 1839, p. 674.—Muller, *Monatber. Berl. Akad.*, 1, 1841, p. 208.

Dimerocrinus D'Orbigny, *Prodr. Pal.*, 1, 1850, p. 46; *Cours elem. Pal.*, 2, p. 142.—Roemer, *Leth. geog.*, 1855, p. 237.—Salter, *Cat. Camb. Sil. Foss.*, 1873, p. 120.—Zittel, *Handb. Pal.*, 1, 1879, p. 368.—Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1881, pp. 358, 371, 405 (*Rev. Pal.* pt. 2, pp. 184, 197, 231); *ibid.*, 1885, p. 323.—Carpenter, *Phil. Trans. Royal Soc. London*, 174, 1884, p. 928.—Bather, *Treatise on Zool.*, pt. 3, *Echinodermata*, London, 1900, p. 198.—Zittel, *Grundzuge Pal.*, 1, 1910, p. 161.—Springer, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 187.

Thysanocrinus Hall, *Pal. New York*, 2, 1852, pp. 188, 355.—Pictet, *Traité de Pal.* 2d ed., 4, 1857, p. 317.—Billings, *Geol. Surv. Canada, Rep. Progr. for 1853-54*, 1857, p. 262.—Hall, 15th Rep. New York State Cab. Nat. Hist. for 1861, 1862, p. 125.—Dujardin and Hupe, *Hist. Nat. des Zoophytes*, 1862, pp. 128, 131.—Shumard, *Trans. Acad. Sci. St. Louis*, 2, 1866, p. 398.—Zittel, *Handb. Pal.*, 1, 1879, p. 377.—Carpenter, *Phil. Trans. Royal Soc. London*, 174, p. 928.—Miller, *N. A. Geol. Pal.*, 1889, p. 286.—Wachsmuth and Springer, *Mem. Mus. Comp. Zool.*, Harvard, 20, 1897, p. 190.—Wachsmuth, *Zittel-Eastman Textb. Pal.* 1, 1900, p. 145.—Weller, *Bull. Chicago Acad. Sci., Nat. Hist. Surv.*, 4, pt. 1, 1900, p. 70, fig. 36.—Grabau, *Bull. New York State Mus.*, 45, 1901, p. 155; *Bull. Buffalo Soc. Nat. Sci.*, 7, 1901, p. 155.—Slocum, *Field Columbia Mus.*, 2, No. 10, *Geol. Ser.*, 1908, p. 299.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 547. (Genotype: *T. liliiformis* Hall.)

Eucrinus Angelin, *Icon. Crin.*, 1878, p. 24, pl. 6, figs. 8, 8a.—Zittel, *Handb. Pal.*, 1, 1879, p. 375.—Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1881, pp. 358, 370 (*Rev. Pal.*, pt. 2, pp. 184, 196); *ibid.*, 1885, p. 323.—Ringueberg, *Ann. New York Acad. Sci.*, 5, 1890, p. 305.—Bather, *Treatise on Zool* (Lankester), pt. 3, 1900, p. 199.—Zittel, *Grundzuge Pal.*, 1, 1910, p. 161. (Genotype: *E. laevis* Angelin.)

Glyptaster Hall, *Pal. New York*, 2, 1852, p. 187; *Trans. Albany Inst.*, 4, 1863, p. 202.—Shumard, *Trans. Acad. Sci. St. Louis*, 2, 1866, p. 373.—Hall, 23rd Rep. New York State Mus. Nat. Hist., Mus. ed., 1879, p. 131.—Zittel, *Handb. Pal.*, 1, 1879, p. 375.—Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1881, pp. 358, 367 (*Rev. Pal.*, pt. 3, pp. 184, 193).—Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 259.—Miller, *N. A. Geol. Pal.*, 1889, p. 247.—Bather, *Treatise on Zool.* (Lankester), pt. 3, 1900, p. 198.—Zittel, *Grundzuge Pal.*, 1910, p. 161. (Genotype: *G. brachiatus* Hall.)

***Dimerocrinus aculeatus* (Hall).**

Thysanocrinus aculeatus Hall, *Pal. New York*, 2, 1852, p. 190, pl. 42, figs. 3a-d.—Pictet, *Traité de Pal.*, 2d ed., 4, 1857, p. 317, pl. 100, fig. 13.

Rhodocrinus (*Thysanocrinus*) *aculeatus* Shumard, *Trans. Acad. Sci. St. Louis*, 2, 1866, p. 398.

Clinton (Rochester): Lockport, New York.

***Dimerocrinus arborescens* (Talbot).**

Thysanocrinus arborescens Talbot, *Amer. Jour. Sci.*, 20, 1905, p. 23, pl. 1, fig. 2; text fig. 1.

Helderbergian (Manlius transition beds, or Coeymans): North Litchfield, New York.

***Dimerocrinus brachiatus* (Hall).**

- Glyptaster brachiatus Hall, Pal. New York, 2, 1852, p. 187, pl. 41, figs. 4a, b.
 Thysanocrinus brachiatus Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 195, pl. 18, fig. 7.
 Clinton (Rochester): Lockport, New York.

***Dimerocrinus campanulatus* (Slocum).**

- Thysanocrinus campanulatus Slocum, Field Columbian Mus., Geol., ed. ser., 10, 1908, p. 299, pl. 85, figs. 20, 23.
 Niagaran (Racine): Drainage Canal, near Lemont, Illinois.

***Dimerocrinus canaliculatus* (Hall).**

- Thysanocrinus canaliculatus Hall, Pal. New York, 2, 1852, p. 189, pl. 42, figs. 2a-d.
 Rhodocrinus (Thysanocrinus) canaliculatus Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 398.
 Clinton (Rochester): Lockport, New York.

***Dimerocrinus egani* (Miller).**

- Glyptaster egani Miller, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 261, pl. 6, figs. 4, 4a, 4b; N. A. Geol. Pal., 1889, p. 247, fig. 311.
 Thysanocrinus egani Weller, Bull. Chicago Acad. Sci., 4, 1900, p. 74, pl. 1, fig. 5.
 Niagaran (Racine): Bridgeport, Illinois.

***Dimerocrinus halli* (Lyon).**

- Rhodocrinus Halli Lyon, Proc. Acad. Nat. Sci. Philadelphia, 1861, p. 412, pl. 4, fig. 5a, b.
 Thysanocrinus Halli Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 196, pl. 13, fig. 9a, b.
 Niagaran (Louisville): Near Louisville, Kentucky.

DIMEROCRINUS IMMATURUS Wachsmuth and Springer. See *Gazacrinus immaturus*.

***Dimerocrinus inornatus* (Hall).**

- Glyptaster inornatus Hall, Trans. Albany Inst., 4, 1863, p. 205; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 207, fig. 3; 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 14, figs. 1-6; Mus. ed., 1879, p. 134, pl. 14, figs. 1-6; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 261, fig. 3; also p. 263, pl. 13, figs. 1-6.
 Thysanocrinus inornatus Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 193, pl. 18, figs. 6a-d; pl. 19, fig. 5.—Grabau and Shimer, N. A. Index Fossils, 11, 1910, p. 547.
 Niagaran: Waldron and Hartsville, Indiana; Newson, Tennessee (Waldron); ?Racine, Wisconsin (Racine).

***Dimerocrinus lilliformis* (Hall).**

- Thysanocrinus lilliformis Hall, Pal. New York, 2, 1852, p. 188, pl. 42, figs. 1a-f.—Grabau, Bull. New York State Mus., 45, 1901, p. 156, fig. 50; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 156, fig. 50.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 199, pl. 18, fig. 4.
 Rhodocrinus (Thysanocrinus) lilliformis Shumard, Trans. Acad. Sci. St. Louis (Cat., Pal. Foss.) 2, 1866, p. 398.
 Dimerocrinus lilliformis Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 373. (Rev. Pal., pt. 2, p. 199.)
 Clinton (Rochester): Lockport, New York.

***Dimerocrinus lockportensis* (Ringueberg).**

Glyptaster (*Eucrinus*) *lockportensis* Ringueberg, *Annals New York Acad. Sci.*, 5, 1890, p. 304, pl. 3, fig. 4.

Niagaran (Lockport, Gasport member): Lockport, New York.

***Dimerocrinus milliganæ* (Miller and Gurley).**

Glyptaster milliganæ Miller and Gurley, *Bull., Illinois State Mus. Nat. Hist.*, 14, 1896, p. 87, pl. 5, figs. 7-9.

Niagaran (Brownsport): Decatur County, Tennessee.

***Dimerocrinus occidentalis* (Hall).**

Glyptaster occidentalis Hall, *Trans. Albany Inst.*, 4, 1863, p. 204 (abstract, p. 10); 20th Rep. New York State Cab. Nat. Hist., 1868 (extras, 1865), p. 326, pl. 10 (1), fig. 3; rev. ed., 1870, p. 369, pl. 10, fig. 3; 20th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 13, figs. 7-11; Mus. ed., 1879, p. 133, pl. 13, figs. 7-11.—Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1881, p. 370 (Rev. Pal. pt. 2, p. 196).—Hall, 11th Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 262, pl. 12, figs. 7-11.—Whitfield, *Geol. Wisconsin*, 4, 1882, p. 281, pl. 16, figs. 3, 4.—Chamberlin, *Geol. Wisconsin*, 1, 1883, p. 191, fig.—Miller, *N. A. Geol. Pal.*, 1889, p. 247, fig. 312.—Wachsmuth and Springer, *Mem. Mus. Comp. Zool. Harvard*, 20, 1897, p. 194, pl. 18, fig. 5a-c.

Thysanocrinus occidentalis Weller, *Bull. Chicago Acad. Sci., Nat. Hist. Surv.*, 4, pt. 1, 1900, p. 73, pl. 1, figs. 6, 7.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 547.

Glyptaster occidentalis var. *crebescens* Hall, 28th Rep. New York State Mus. Nat. Hist., Mus. ed., 1879, p. 133; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 263.

Niagaran: Waldron and Hartsville, Indiana (Waldron): Racine, Wisconsin; Bridgeport and Hawthorne, Illinois (Racine).

***Dimerocrinus pentangularis* (Hall).**

Glyptaster pentangularis Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 326, pl. 10 (1), fig. 4 (extras, 1865); *ibid.*, rev. ed., 1870, p. 369, pl. 10, fig. 4.

Thysanocrinus pentangularis Weller, *Bull. Chicago Acad. Sci. Nat. Hist. Surv.*, 4, pt. 1, 1900, p. 70, pl. 1, figs. 8-11.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 547.

Niagaran (Racine): Racine, Wisconsin; Bridgeport and Hawthorne, Illinois.

***Dimerocrinus roemeri* (Troost).**

Gilbertocrinites roemeri Troost MS., 1850.

Dimerocrinus roemeri (Troost) Wood, *Bull. U. S. Nat. Mus.*, 64, 1909, p. 101, pl. 15, fig. 4.

Niagaran (Brownsport): Decatur and Perry Counties, Tennessee.

Holotype.—Cat. No. 39968, U.S.N.M.

***Dimerocrinus waldronensis* (Miller and Dyer).**

Cyathocrinus waldronensis Miller and Dyer, *Cont. to Pal.*, 2, 1878, p. 6, pl. 4, fig. 9.—Miller and Gurley, *Bull. Illinois State Mus. Nat. Hist.*, 1896, p. 49, pl. 3, figs. 19, 20.—Miller, *N. A. Geol. Pal.*, 2d App., 1897, p. 741, fig. 1330.

Dimerocrinus waldronensis Wachsmuth and Springer, *Proc. Acad. Nat. Sci. Philadelphia*, 1885, p. 323 (Rev. Pal., pt. 3, sec. 1, p. 101).

Macrostylocrinus waldronensis Wachsmuth and Springer, *ibid.*, 1886, p. 149 (Rev. Pal., pt. 3, sec. 2, p. 225).

Niagaran (Waldron): Waldron, Indiana.

DIMORPHOGRAPTUS Lapworth.Genotype: *D. elongatus* Lapworth.

Dimorphograptus Lapworth, *Geol. Mag.*, dec. 2, 3, 1876, p. 545.—Elles and Wood, *Mon. British Grapt.*, 8, 1911, p. 348.

Dimorphograptus decussatus Elles and Wood.

Dimorphograptus decussatus Elles and Wood, *Mon. British Grapt.*, 8, 1911, p. 352, pl. 35, figs. 5a-e.

Silurian: Scotland (Llandovery-Birchill); Blaylock Mountain, Montgomery County, Arkansas (Blaylock) [Ulrich].

DINOBOULUS Hall.Genotype: *Obolus conradi* Hall.

Dinobolus Hall, Notes on Some New or Imperfectly Known Forms among the Brach., (March) 1871, p. 4; *ibid.*, 1872, p. 4.—Davidson and King, *Geol. Mag.*, 9, p. 442; *Ann. Mag. Nat. Hist.*, 4th ser., 10, p. 248.—Hall, 23d Rep. New York State Cab. Nat. Hist., 1873, p. 247.—Hall and Whitfield, *Pal. Ohio*, 2, 1873, p. 130.—Davidson and King, *Quart. Jour. Geol. Soc. London*, 30, 1874, p. 159.—Zittel, *Handb. Pal.*, 1, 1880, p. 668.—Miller, *N. A. Geol. Pal.*, 1889, p. 343.—Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, pp. 36, 46, 164; 11th Ann. Rep. New York State Geol., 1894, p. 237.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 231, fig. 190, 2.—Schuchert, *Zittel-Eastman Pal.*, 1, 1900, p. 306, 2d ed., 1913, p. 373.—Grabau and Shimer, *North Amer. Index Fossils*, 1, 1907, p. 190.

Obolellina Billings, *Canadian Nat. Geol.*, 6, 1871, p. 222; *ibid.*, 6, 1872, p. 326, figs. 1, 2; *Amer. Jour. Sci.*, 3d ser., 3, 1872, p. 270.

Conradia Hall (not Adams), 23d Rep. New York State Cab. Nat. Hist., 1873, p. 250.—Davidson and King, *Quart. Jour. Geol. Soc. London*, 30, 1874, p. 159.

Dinobolus canadensis (Billings).

Obolus canadensis Billings, *Canadian Nat. Geol.*, 3, 1858, p. 441, fig. 20-23 (not fig. 19=*D. magnificus*); *Geol. Surv. Canada*; *Rep. Prog. for 1857*, 1858, p. 189, figs. 20-23 (not fig. 19); *Geol. Canada*, 1863, p. 142, figs. 75.

Obolellina canadensis Billings, *Canadian Nat. Geol.*, 6, 1871, p. 222; *ibid.*, 1872, p. 326, fig. 15; fig. 6, p. 329.

Dinobolus canadensis Davidson and King, *Quart. Jour. Geol. Soc. London*, 30, 1874, p. 162, pl. 19, fig. 7.

Black River (Leray): Pauquette's Rapids, etc., Canada.

Dinobolus conradi (Hall).

Obolus conradi Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 368, pl. 13, figs. 1, 2.—Chamberlin, *Geol. Wisconsin*, 1, 1883, p. 192, fig.

Obolus (*Trimerella*?) *conradi* Meek and Worthen, *Geol. Surv. Illinois*, 3, 1868, p. 351, pl. 5, fig. 7.

Trimerella conradi Dall, *American Jour. Conch.*, 7, 1871, p. 83.

Dinobolus conradi Hall, 23d Rep. New York State Cab. Nat. Hist., 1873, p. 247 (also extracts 1871, 1872).—Davidson and King, *Quart. Jour. Geol. Soc. London*, 30, 1874, p. 160, pl. 18, figs. 1-5.—Hall and Whitfield, *Pal. Ohio*, 2, 1875, p. 130, pl. 7, figs. 3, 4.—Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, p. 38, pl. 4B, figs. 13-24.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 428, pl. 1, fig. 8.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 190, fig. 255a.

Niagaran: Port Byron, Illinois; Leclaire, Iowa; Racine and Grafton, Wisconsin (Racine); Crawford, Ohio; England; Gotland.

Plesiotype.—Cat. No. 52938, U.S.N.M.

Dinobolus magnificus (Billings).

Obolus canadensis Billings (part), Geol. Surv. Canada, Rep. Prog. for 1857, 1858, p. 189, fig. 19 (not 20-23); Canadian Nat. Geol., 3, 1858, p. 441, fig. 19 (not figs. 20-23=D. canadensis).

Obolellina magnificus Billings, *ibid.*, n. ser., 6, 1872, p. 329, fig. 7.

Dinobolus magnificus Davidson and King, Quart. Jour. Geol. Soc. London, 3, 1874, p. 164, pl. 19, fig. 8.—Nicholson, Pal. Prov. Ontario, 1875, p. 17, fig. 1.

Black River (Leray): Pauquette's Rapids, etc., Canada.

Dinobolus(?) parvus Whitfield.

Dinobolus? parvus Whitfield, Geol. Wisconsin, 4, 1882, p. 347, pl. 27, figs. 8-10.—Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 356, fig. 27.—Whiteaves, Pal. Foss., 3, pt. 3, 1897, p. 166.

Trenton: Whitewater, Wisconsin; Wykoff, Minnesota (Prosser); Lake Winnipeg, Canada.

Plastotype.—Cat. No. 45548, U.S.N.M.

DINORTHIS Hall and Clarke.

Genotype: *Orthis pectinella* Emmons.

Dinorthis Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 195-222.—Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 420.—Hall and Clarke, 11th Ann. Rep. New York State Geol., 1894, p. 266.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 252.—Cumings, 32d Ann. Rep. Dep. Geol. and Nat. Res. Indiana, 1908, p. 888.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 382.

Plasiomys Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 196; 11th Ann. Rep. New York State Geol., 1894, p. 266.—Schuchert, Zittel Textb. Pal., 1913, p. 382. (Genotype: *Orthis subquadrata* Hall.)

Valcourea (subgenus of *Plasiomys*) Raymond, Ann. Carnegie Mus., 7, 1911, p. 239. (Genotype: *Plasiomys strophomenoides* Raymond.)

Dinorthis carleyi (Hall).

Orthis retrorsa Billings (not Salter), Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 136, fig. 113 (adv. sheets, 1862) (not fig. 112=D. retrorsa).—Meek, Pal. Ohio, 1, 1873, p. 92, pl. 11, fig. 7.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 37.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1880, p. 532, figs.—McCreery, Amer. Geol., 5, 1890, p. 102.

Plasiomys retrorsa Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 197, 222; pl. 5A, figs. 14-16.

Dinorthis retrorsa Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 902, pl. 33, figs. 7-7d.—Foerste, Amer. Geol., 31, 1903, p. 335 (loc. occ.).

Orthis carleyi Hall, 13th Rep. New York State Cab. Nat. Hist., 1860, p. 120, fig.; 2d Ann. Rep. New York State Geol., 1883, pl. 34, figs. 28, 29.

Dinorthis carleyi Foerste, Ohio Nat., 12, No. 3, 1912, p. 453, pl. 22, fig. 8.

Orthis kennicotti McChesney, New Pal. Fossils, 1861, p. 78.

Richmond (Arnheim): Oxford, etc., Ohio; Indiana; Kentucky; Tennessee.

Dinorthis carleyi insolens Foerste.

Dinorthis carleyi-insolens Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 320, pl. 7, fig. 9.

Richmond (Waynesville): Miltonville, etc., Ohio; Indiana.

Dinorthis (Valcourea) deflecta (Conrad).

Strophomena deflecta Conrad, Proc. Acad. Nat. Sci. Philadelphia, 1, 1843, p. 332.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 70.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 198.

Dinorthis (Valcourea) deflecta—Continued.

- Strophomena recta* Conrad, Proc. Acad. Nat. Sci. Philadelphia, 1, 1843, p. 332.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 70.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 199.
- Leptæna deflecta* Hall, Pal. New York, 1, 1847, p. 113, pl. 31B, fig. 5.
- Leptæna recta* Hall, *ibid.*, 1847, p. 113, pl. 31B, fig. 6.
- Streptorhynchus rectus* Miller, Amer. Pal. Foss., 1877, p. 134.
- Streptorhynchus deflectum* Miller, N. A. Geol. Pal., 1889, p. 378.
- Plæsiomys deflecta* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 197, 222, pl. 5A, figs. 28–34.
- Plæsiomys recta* Hall and Clarke, *ibid.*, 1892, pp. 197, 222.
- Plæsiomys loricula* Hall and Clarke, *ibid.*, 1892, pp. 197, 341, pl. 5A, figs. 31–34.
- Orthis (Dinorthis) deflecta* Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 422, pl. 32, figs. 24–30.
- Orthis (Plæsiomys) loricula* Hall and Clarke, 48th Rep. New York State Mus., 2, for 1895, 1897, p. 339, pl. 4, figs. 7–9; 14th Rep. State Geol. New York for 1894, 1897, p. 339, pl. 4, figs. 7–9.
- Dinorthis deflecta* Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 252, fig. 303a–d.
- Black River: Mineral Point, Beloit, Janesville, Wisconsin; Dixon, Illinois; Minneapolis, St. Paul, etc., Minnesota; McGregor, Iowa; central Tennessee; Highbridge, Kentucky.
- Stone River: Central Tennessee.

Dinorthis fontinalis (White).

- Strophomena fontinalis* White, Wheeler's Expl. and Surv. West 100th Merid., 4, 1875, p. 54, pl. 3, fig. 4; Prelim. Rep., p. 10, 1874.
- Dinorthis fontinalis* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 215.
- Middle Ordovician: Fish Spring, House Range, Utah.
- Cotypes*.—Cat. No. 17223, U.S.N.M.

Dinorthis (Plæsiomys) iphigenia (Billings).

- Orthis iphigenia* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 133, pl. 110 (adv. sheets, 1862).
- Plæsiomys iphigenia* Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 222.
- Dinorthis iphigenia* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 215.
- Trenton: Ottawa, Ontario.

Dinorthis meedsi (Winchell and Schuchert).

- Orthis meedsi* Winchell and Schuchert, Amer. Geol., 9, April 1, 1892, p. 289.
- Orthis minnesotensis* Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, April 9, 1892, p. 332, pl. 5, figs. 14–17.
- Orthis (Dinorthis) meedsi* Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 427, pl. 32, figs. 39–42.
- Dinorthis meedsi* Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 253, fig. 303e–h.
- Trenton (Prosser): Cannon Falls, Kenyon, Preston, etc., Minnesota; Decorah and McGregor, Iowa; Neenah and Oshkosh, Wisconsin.

Dinorthis meedsi arctica (Schuchert).

- Orthis (Dinorthis) meedsi* var. *arctica* Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 157, pl. 12, figs. 7, 8.
- Mohawkian: Head of Frobisher Bay, Baffin Land.
- Cotypes*.—Cat. No. 28152, U.S.N.M.

***Dinorthis meedsi germana* (Winchell and Schuchert).**

Orthis meedsi var. *germana* Winchell and Schuchert, Amer. Geol., 9, 1892, p. 290.

Orthis (*Dinorthis*) *meedsi* var. *germana* Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 428, pl. 32, figs. 43-45.

Dinorthis meedsi germana Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 215.

Trenton (Prosser): Cannon Falls, Kenyon, and Fountain, Minnesota.

***Dinorthis pectinella* (Emmons).**

Orthis pectinella Emmons, Geol. New York, Rep. 2d Dist., 1842, p. 394, fig. 2.—Owen, Amer. Jour. Sci. Arts, 47, 1844, p. 366, fig. 2.—Hall, Pal. New York, 1, 1847, p. 123, pl. 32, fig. 10.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 193, pl. 9, figs. 10, 11, a, b.—Billings, Can. Nat. Geol., 1, 1857, p. 205, fig. 5.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 818, fig. 602.—Emmons, Manual Geology, 1860, p. 99, fig. 88.—Billings, Geol. Canada, 1863, p. 165, fig. 147.—Hitchcock, Geol. Vermont, 1, 1862, p. 294, fig. 202.—Chapman, Canadian Jour., n. s., 7, 1862, p. 111, fig. 92; *ibid.*, 8, 1863, p. 199, fig. 184; Expos. Min., Geol. Canada, 1864, p. 115, fig. 91; p. 171, fig. 183.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 155, fig.—Hall, 2d Ann. Rep. New York State Geol., 1883, pl. 34, figs. 39, 40.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 527, figs.

Orthis pectinella var. *semiovalis* Hall, Pal. New York, 1, 1847, p. 124, pl. 32, fig. 11.—Miller, N. A. Geol. Pal., 1889, p. 359.

Dinorthis pectinella Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 195, 222, 228, pl. 5, figs. 27-33.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 154, pl. 9, figs. 29, 30.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 253, fig. 303i-1.—Baesler, Bull. Virginia Geol. Surv., 2a, 1909, pl. 24, fig. 2.

Orthis (*Dinorthis*) *pectinella* Winchell and Schuchert, Minnesota Geol. Survey, 3, 1893, p. 424, pl. 32, figs. 31-34.—Whiteaves, Pal. Fossils, 3, pt. 3, 1897, p. 175.

Orthis charlotte Winchell, 8th Rep. Geol. Nat. Hist. Surv. Minnesota, 1880, p. 67. Upper Black River and Early Trenton: Middleville, Trenton Falls, etc., New York; Pennsylvania; Mercer County, Kentucky; Ontario; Decorah, Iowa; St. Paul, Minneapolis, and Cannon Falls, Minnesota; Lake Winnipeg, Canada; Tennessee; Virginia.

***Dinorthis pectinella sweeneyi* (N. H. Winchell).**

Orthis sweeneyi N. H. Winchell, 9th Rep. Geol. Nat. Hist. Surv. Minnesota, 1881, p. 117.

Dinorthis sweeneyi Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 196, 222, 228, pl. 5, figs. 34-36.

Orthis (*Dinorthis*) *pectinella* var. *sweeneyi* Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 426, pl. 32, figs. 35-38.

Black River (Decorah): St. Paul, Cannon Falls, etc., Minnesota; Decorah and McGregor, Iowa.

***Dinorthis* (*Plæsiomys*) *platys* (Billings).**

Orthis platys Billings, Canadian Nat. Geol., 4, 1859, p. 438, fig. 15; Geol. Canada, 1863, p. 129, fig. 54.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 218.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1893, p. 424.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 530, figs.

Dinorthis platys Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 216.

Plæsiomys platys Raymond, Ann. Carnegie Mus., 7, 1911, p. 238, pl. 35, figs. 13-14.

Chazy: Montreal, Quebec; Crown Point, Valcour Island, and Chazy, New York (Crown Point); East Tennessee (Lenoir).

DINORTHIS PORCATA Schuchert (part). See *Dinorthis* (*Plæsiomys*) *porcata anticosiensis*.

***Dinorthis* (*Plæsiomys*) *porcata anticosiensis* (Shaler).**

Orthis porcata Billings (not McCoy), Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 135, fig. 111 (adv. sheets); Geol. Canada, 1863, p. 312, fig. 319.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 531, figs.

Plæsiomys porcata Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 197, 22, pl. 5A, figs. 20, 21.

Dinorthis porcata Schuchert (part), Bull. U. S. Geol. Surv., 87, 1897, p. 216.

Orthis anticosiensis Shaler, Fossil Brach. of the Ohio Valley, 1887, p. 19, pl. 6. Richmond: English Head, etc., Anticosti (Ellis Bay); Stony Mountain, Manitoba Stony Mountain).

***Dinorthis proavita* (Winchell and Schuchert).**

Orthis proavita Winchell and Schuchert, Amer. Geol., 9, April 1, 1892, p. 290.

Orthis petrae Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, April 9, 1892, p. 332, pl. 5, figs. 18-21.

Orthis (*Dinorthis*) *proavita* Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 431, pl. 32, figs. 51-57.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 120.—?Whiteaves, Pal. Foss., 3, pt. 3, 1897, p. 176.

Dinorthis proavita Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 216.

Richmond: Spring Valley, Minnesota; Wilmington, Illinois; Lake Winnipeg, Manitoba; Texas; etc.

***Dinorthis* (*Plæsiomys*) *retrorsa* (Salter).**

Orthis retrorsa Salter, Mem. Geol. Surv. Great Britain, 2, 1858, p. 373, pl. 27, figs. 3, 4.—Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 136, fig. 112 (not 113=*D. carleyi*) (adv. sheets, 1862).

Plæsiomys retrorsa Ruedemann, Bull. New York State Mus., 162, 1912, p. 93, pl. 4, figs. 9-12.

Middle Ordovician: Wales (Bala); Snake Hill, Saratoga County, New York, and Ottawa, Ontario (Trenton).

DINORTHIS RETRORSA Cumings. See *Dinorthis carleyi*.

DINORTHIS SCOVILLEI Foerste. See *Plectorthis* (*Austinella*) *scovillei*.

***Dinorthis* (*Valcourea*) *strophomenoides* (Raymond).**

Plæsiomys strophomenoides Raymond, Amer. Jour. Sci., 4th ser., 20, p. 370.

Valcourea strophomenoides Raymond, Ann. Carnegie Mus., 7, 1911, p. 240, pl. 35, figs. 15-19; pl. 36, fig. 1, text fig. 12.

Chazyan: Valcour Island and Plattsburg, New York (Crown Point) East Tennessee (Lenoir).

***Dinorthis* (*Plæsiomys*) *subquadrata* (Hall).**

Orthis subquadrata Hall, Pal. New York, 1, 1847, p. 126, pl. 32A, fig. 1; Geol. Wisconsin, 1, 1862, p. 54, figs. 1, 2.—Meek, Pal. Ohio, 1, 1873, p. 94, pl. 9, fig. 2.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 38.—White, 2d Ann. Rep. Indiana Bureau Stat. Geol., 1880, p. 484, pl. 1, figs. 3-5; 10th Rep. State Geol. Indiana, 1881, p. 116, pl. 1, figs. 3-5.—Shaler, Foss. Brach. of the Ohio Valley, 1876, p. 22, pl. 7.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 535, figs.—Keyes, Geol. Surv. Missouri, 5, 1895, p. 60.

?*Orthis subquadrata* Billings, Geol. Canada, 1863, p. 165, fig. 146.

Platystrophia subquadrata Hall, 36th Rep. New York State Mus. Nat. Hist., 1884, p. 75, pl. 3, fig. 4.

Dinorthis (Plæsiomys) subquadrata—Continued.

Plæsiomys subquadrata Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 194, 196, 222, pl. 5A, figs. 17–19.

Orthis (*Dinorthis*) *subquadrata* Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 428, pl. 32, figs. 46–50.—Whiteaves, Pal. Foss., 3, pt. 3, 1897, p. 176.

Dinorthis subquadrata Hayes and Ulrich, U. S. Geol. Surv., folio 95, 1903, illus. sheet, figs. 7, 8.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 254, fig. 303m-o.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1907, p. 904, pl. 34, figs. 1–1b.

Richmond: Ohio Valley; Spring Valley, Minnesota; Wilmington, Illinois; Warren and Jefferson Counties, Missouri; Lattners, Iowa; Iron Ridge, Wisconsin; Lake Winnipeg, Canada; Anticosti; Texas; etc.

Plesiotype.—Cat. No. 35454, U.S.N.M. (Hayes and Ulrich).

DINORTHEIS SWEENEYI Hall and Clarke. See *Dinorthis pectinella sweeneyi*.

Dinorthis (Plæsiomys) ulrichi Foerste.

Dinorthis ulrichi Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 320, pl. 7, fig. 7a-c.

Trenton (Flanagan): Near Becknerville, Clark County, Flanagan and Paris, Kentucky.

DIONE Barrande. See *Dionide* Barrande.

DIONIDE Barrande.

Genotype: *Dione formosa* Barrande.

Dione Barrande, Note Prelim. Sil. Syst. Boheme, 1846, p. 32.

Dionide Barrande, Neues Jahrb. f. Min., pt. 4, 1847, p. 391, footnote; Syst. Sil. du Centre Boheme, 1, 1852, p. 640.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 510.—Barrande, Syst. Sil. du Centre Boheme, 1, Suppl., 1872, p. 50.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1880, p. 289.—Zittel, Handb. Pal., 2, 1885, p. 594.—Miller, N. A. Geol. Pal., 1889, p. 544.—Koken, Die Leitfossilien, Leipzig, 1896, p. 15, text fig. 9, fig. 2.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, pp. 184, 186.—Lindström, Kongl. Svæn. Vet.-Akad. Handl., 34, No. 8, 1901, p. 32.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 510.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 711.

Polytomurus Hawle and Corda, Abh. d. k. böhmischen Gesell. d. Wiss., 5 (extract), 1847, p. 37, pl. 3, fig. 16.—Angelin, Pal. Scandinavica, 3d ed., Holmise, 1878, p. 12.

Dionide(?) perplexa Billings.

Dionide? *perplexa* Billings, Cat. Sil. Foss. Anticosti, 1866, p. 67.

Anticostian (Jupiter River): The Jumpers, Anticosti.

DIORYCHOPORA Davis.

Genotype: *D. tenuis* Davis.

Diorychopora Davis, Kentucky, Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, expl. of pl. 74.

Diorychopora tenuis Davis.

Diorychopora tenuis Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 74, fig. 6.

Niagaran (Louisville): Near Louisville, Kentucky.

DIPHYPHYLLUM Lonsdale.

Genotype: *D. concinnum* Lonsdale.

Diphyphyllum Lonsdale, Murchison's Geol. Russia in Europe, 1, 1845, p. 622.—McCoy, British Pal. Rocks Foss., 1854, p. 87.—Billings, Canadian Jour., n. s., 4, 1859, p. 133.—Dybowski, Archiv. f. Naturf. Liv-, Ehet. und. Kurl., 5, 1874, p. 337.—Nicholson, Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 31.—

DIPHYPHYLLUM—Continued.

Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 120.—Lindström, Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 15.—Thomson and Nicholson, Ann. Mag. Nat. Hist., ser. 4, 17, 1876, p. 123.—Zittel, Handb. Pal., 1, 1879, p. 231.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 357.—Frech, Pal. Abhandl., Dames and Kayser, 3, Heft 3, 1886, p. 94.—Miller, N. A. Geol. Pal., 1889, p. 186.—Sherzer, Amer. Geol., 7, 1891, pp. 290–295.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 157.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 25, 26.

Diphyphyllum Hall, Amer. Jour. Sci. and Arts., 2d ser., 11, 1851, p. 399; Pal. New York, 2, 1852, p. 115; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 80.—Grabau, Bull. New York State Mus., 45, 1901, p. 139; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 139.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, pp. 25, 26.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 73. (Genotype: *D. caespitosum* Hall.)

***Diphyphyllum billingsi* Greene.**

Diphyphyllum billingsi Greene, Cont. Indiana Pal., 11, 1903, p. 98, pl. 31, figs. 2, 3.

Niagaran (Louisville): Louisville, Kentucky.

***Diphyphyllum caespitosum* (Hall).**

Diphyphyllum caespitosum Hall, Pal. New York, 2, 1852, p. 116, pl. 33, figs. 1a–r, 2.—Grabau, Bull. New York State Mus., 45, 1901, pp. 139–140, fig. 33; Bull. Buffalo Soc. Nat. Hist., 7, 1901, p. 139, fig. 33.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 25.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 74, fig. 117.

Diphyphyllum caespitosum Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 80 (gen. ref.).—Lambe, Ottawa Nat., 12, 1899, p. 240.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 343.—Lambe, Contr. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 158, pl. 13, figs. 3, 3a, 3b.

Cyathophyllum pelagicum Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 108 (adv. sheets, 1862); Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 34 (loc. ref.).

Silurian: Lockport, etc., New York; Ontario (Lockport); Wisconsin (Racine and Guelph); Island of Anticosti (Becsie River, Gun River); Ontario (Cataract).

***Diphyphyllum coralliferum* (Hall).**

Diphyphyllum coralliferum Hall, Pal. New York, 2, 1852, p. 322, pl. 72, figs. 1a–c.

Diphyphyllum coralliferum Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 80 (gen. ref.).—Schuchert, Amer. Geol., 31, 1903, p. 163. (loc. occ.)

Cayugan (Cobleskill): Schoharie, etc., New York.

***Diphyphyllum huronicum* Rominger.**

Diphyphyllum Huronicum Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 121, pl. 45, fig. 1.

Eridophyllum huronicum Davis, Kentucky, Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 109, fig. 2; pl. 111.

Niagaran: Point Detour, Michigan; Drummond Island; Louisville, Kentucky.

***Diphyphyllum integumentum* (Barrett).**

Diphyphyllum integumentum Barrett, Ann. New York Acad. Sci., 1, 1878, p. 123.—Weller, Geol. Surv. New Jersey, Rep. Pal., 3, 1903, p. 218, pl. 17, fig. 11.

Diphyphyllum integumentum—Continued.

Diplophyllum integumentum Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1906, p. 106, pl. 10, fig. 1; pl. 15, fig. 9-10; pl. 16, figs. 15 and 17.

Helderbergian (Decker Ferry): Two miles south of Tristates, New York.
Upper Monroan (Anderdon and Amherstburg); Detroit River area.

Diphyphyllum? multicaule (Hall).

Syringopora? multicaulis Hall, Pal. New York, 2, 1852, p. 119, pl. 33, fig. 3a-g—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 493, footnote.

Diphyphyllum multicaule Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 12, pl. 45, figs. 3, 4.—Sherzer, Amer. Geol., 6, 1890, p. 61.—Lambe, Ottawa Nat. 12, 1899, p. 241; Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 13, pl. 13, figs. 4, 4a-c.

Synaptophyllum multicaule Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1906, p. 105, pl., 12, fig. 6.

Eridophyllum vennori Billings, Canadian Nat. Geol., n. s., 2, 1865, p. 430.

Diphyphyllum vennori Miller, N. A. Geol. Pal., 1889, p. 186 (gen. ref.).

Silurian: Lockport, etc., New York (Lockport); Michigan; Manitowlin Island, Lake Huron (Cataract).

Upper Monroan (Amherstburg): Detroit River, opposite Amherstburg, Ontario.

Diphyphyllum proliferum Foerste.

Diphyphyllum proliferum Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 102, pl. 1, figs. 18A-d.

Niagaran (Brownsport): Near Linden; Brownsport Furnace and Savannah, Tennessee.

DIPHYPHYLLUM RUGOSUM Rominger. See *Eridophyllum rugosum*.

DIPHYPHYLLUM STOKESI Whiteaves. See *Columnaria* (*Palaephyllum*) *stokesi*.

DIPHYPHYLLUM VENNORI Miller. See *Diphyphyllum multicaule*.

DIPLASPIS Matthew. See *Cyathaspis* Lankester.

DIPLEURA Green. See *Homalonotus* Koenig.

DIPLOCERAS Conrad. See *Endoceras* Hall.

DIPLOCLEMA Ulrich.

Genotype: *D. trentonense* Ulrich.

Diploclema Ulrich, Geol. Surv. Illinois, 8, 1890, p. 368; (Ulrich, in press), Miller, N. A. Geol. Pal., 1889, p. 300.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 262.—Pocta, Syst. Sil. du Centre Boheme, 8, pt. 1, 1894, p. 17.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 22.—Grabau, Bull. New York State Mus., 45, 1901, p. 162; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 162.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 17; Zittel-Eastman Textb. Pal., 1913, p. 321.

Diploclema sparsum (Hall).

Trematopora sparsa Hall, Pal. New York, 2, 1852, p. 155, pl. 40A, figs. 12a-d.—*Diploclema sparsum* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 369, pl. 53, fig. 10.—Grabau, Bull. New York State Mus., 45, 1901, p. 162, fig. 57; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 162, fig. 57.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 17, pl. 5, figs. 6, 7; pl. 23, figs. 4-6.

Clinton (Rochester): Lockport, etc., New York; Grimsby and Hamilton, Ontario.

Anticostian (Gun River-Jupiter River): Anticosti.

Pteriotype.—Cat. No. 44071, U.S.N.M.

Diploclema sparsum argutum Bassler.

Diploclema sparsum var. *argutum* Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 17, 18, pl. 5, figs. 8, 9.

Clinton (Rochester): Lockport, New York.

Holotype.—Cat. No. 35557, U.S.N.M.

Diploclema trentonense Ulrich.

Diploclema trentonense Ulrich, Geol. Surv. Illinois, 8, 1890, p. 369, pl. 53, figs. 9-9c.

Trenton: Trenton Falls, New York.

Cotypes.—Cat. No. 43251, U.S.N.M.

DIPLOGRAPSPUS AMPLEXICAULE Emmons. See *Diplograptus* (*Glyptograptus*) *amplexicaulis*.

DIPLOGRAPSPUS ANTENNARIUS Nicholson. See *Cryptograptus antennarius*.

DIPLOGRAPSPUS CILIATUS Emmons. See *Glossograptus arthracanthus*.

Diplograptus foliosus Emmons. Undeterminable.

Diplograptus foliosus Emmons, Amer. Geology, 1, pt. 2, 1855, p. 106, pl. 1, fig. 13; Manual Geology, 1860, p. 87, fig. 68.

Mohawkian: Augusta County, Virginia.

DIPLOGRAPSPUS HUDSONICUS Nicholson. See *Diplograptus hudsonicus*.

DIPLOGRAPSPUS LACINIATA Emmons. See *Diplograptus foliaceus*.

DIPLOGRAPSPUS MUCRONATUS McCoy. See *Lasiograptus mucronatus*.

DIPLOGRAPSPUS OBLIQUIS Emmons. See *Diplograptus foliaceus*.

Diplograptus stenocetus Gurley. Not recognized.

Diplograptus stenocetus Gurley, Jour. Geol., 4, 1896, p. 78.

Trenton (Magog): Magog, Quebec.

DIPLOGRAPSPUS WHITFIELDI Nicholson. See *Glossograptus whitfieldi*.

DIPLOGRAPTUS McCoy. Genotype: *Graptolithus foliaceus* Murchison.

Diplograptus McCoy, Ann. Mag. Nat. Hist., 6, 1850, p. 270; British Pal. Rocks Foss., 1854, p. 3.—Geinitz, Amer. Jour. Sci. Arts, 2d ser., 14, 1852, p. 128; Bull. Soc. Geol. France, 2d ser., 9, 1852, p. 187; Zeits. d. d. geol. Gesell., 3, 1852, p. 339.—Richter, Zeits. d. d. geol. Gesell., 5, 1853, p. 455.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 104.—Chapman, Canadian Jour., n. s., 1, 1856, p. 389; 6, 1861, p. 506; Expos. Min. Geol. Canada, 1864, p. 100.—Nicholson, Quart. Jour. Geol. Soc. London, 24, 1868, pp. 9, 137; Mon. British Grapt., 1872, p. 115.

Diplograptus Dana, Amer. Jour. Sci. Arts, 2d ser., 14, 1852, p. 128.—Hall, Geol. Surv. Canada, dec. 2, 1865, p. 109; 20th Rep. New York State Cab. Nat. Hist., p. 217; rev. ed., 1868 (1870), p. 251.—Zittel, Handb. Pal., 1, 1879, p. 300.—Dairon, Trans. Geol. Soc. Glasgow, 7, 1883, p. 177.—Tullberg, Sveriges Geol. Unders., ser. C, no. 55, 1883, pp. 13, 14.—Spencer, Trans. Acad. Sci. St. Louis, 4, 1884, p. 561.—Miller, N. A. Geol. Pal., 1889, p. 186.—James, Jour. Cincinnati Soc. Nat. Hist., 14, pt. 2, p. 157.—Wiman, Jour. Geol., 2, 1894, p. 267.—Ruedemann, 48th Rep. New York State Mus., 2, 1897, p. 244; 14th Rep. State Geol. New York for 1894, 1897, p. 244.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, 1896, p. 264.—Koken, Die Leitfossilien, Leipzig, 1896, p. 329.—Wiman, Nat. Sci., 9, 1896, p. 188.—Roemer and Frech, Leth. geog.,

DIPLOGRAPTUS—Continued.

1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 624.—Walther, Zeits. d. d. geol. Gesell., 49, 1897, p. 250.—Ruedemann, Amer. Nat., 32, 1898, p. 3: Zittel-Eastman Textb. Pal., 1, 1900, p. 119.—Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. xxxii.—Ruedemann, Mem. New York State Mus., 7, 1904, p. 718, 719.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 33.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 339–341; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 130.

Glyptograptus Zittel, Handb. Pal., 1, 1879, p. 300.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, No. 4, 1896, p. 264.—Roemer and Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, pp. 625, 632.

Diplograptus acutus (Elles and Wood).

Diplograptus vulgatus var. *acutus*, Elles and Wood, Mon. British Grapt., pt. 6, 1907, p. 242, pl. 30, figs. 3a–c.

Ordovician: South Scotland (Glenkiln); Arkansas (Stringtown).

DIPLOGRAPTUS AMPLEXICAULE Walcott (part). See *Diplograptus peosta*.

DIPLOGRAPTUS AMPLEXICAULE Whitfield. See *Diplograptus amplexicaulis pertenuis*.

Diplograptus (Glyptograptus) amplexicaulis (Hall).

Graptolithus amplexicaule Hall, Pal. New York, 1, 1847, pp. 79, 316, pl. 26, figs. 11a, b.—Hitchcock, Geol. Vermont, 1, 1861, p. 291, text fig.; New York State Cab. Nat. Hist., 20th Ann. Rep., 1868, pl. 3, figs. 6, 7, rev. ed., 1878, p. 223.

Diplograptus amplexicaule Emmons, Amer. Geology, 1, pt. 2, 1855, p. 236, pl. 7, figs. 11a, b.

Diplograptus amplexicaulis Lapworth, Proc. and Trans. Roy. Soc. Can., 1886, 4, p. 184.—White Trans. New York Acad. Sci., 15, 1895, p. 93.—Ruedemann, Bull. New York State Mus., 39, 1901, p. 497ff.

Diplograptus foliaceus mut. *amplexicaule* Gurley, Jour. Geol., 4, 1896, p. 298.

Diplograptus (Glyptograptus) amplexicaulis Frech, Leth. geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 632 (gen. ref.).—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 361–365, pl. 25, figs. 10–13, text figs. 302–307.

Trenton: Trenton Falls, Middleville, and Washington County, New York.

Diplograptus amplexicaulis pertenuis Ruedemann.

Diplograptus amplexicaule Whitfield, U. S. Geol. Sur. West 100th Merid., Wheeler's Rep., 4, Pal., 1877, p. 19.—Ruedemann, Bull. New York State Mus., 8, 1901, p. 533, footnote.

Diplograptus amplexicaulis var. *pertenuis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 365, 366, pl. 25, figs. 14–16, text figs. 308–310.

Trenton (Snake Hill): Lansingburg and Troy, New York.

Diplograptus (Glyptograptus) angustifolius (Hall).

Graptolithus angustifolius Hall, Pal. New York, 3, 1859, p. 515, figs. 1, 2; New York State Cab. Nat. Hist., 13th Ann. Rep., 1860, p. 59, figs. 1, 2.

Diplograptus angustifolius Nicholson, Geol. Soc. Lond. Quar. Jour., 1863, p. 525, pl. 19, figs. 8, 9.—Lapworth, Cat. West. Scott. Foss., 1876, pl. 2, fig. 35; Belfast Nat. Field Club., Rep. and Proc., App., 1, pt. 4, 1877, p. 132, pl. 6, fig. 11; Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 21.—Walcott, Alb. Inst. Trans., 10, 1881 (adv. sheets, 1879, p. 34).—Lapworth, Geol. Sur. Can. Rep., 2d ser., 2, 1886, p. 22D; Sci., 9, 1887, p. 320.—Ami, Geol. Sur. Can. Rep., 2d ser., 3, pt. 2, 1889, p. 116K.—Walcott, Bull. Geol. Soc. Amer., 1, 1890, p. 339.—Barrois, Ann. Soc. Geol. du Nord, 20, 1892, p. 145.—Gurley, Jour. Geol., 4, 1896, p.

Diplograptus (Glyptograptus) angustifolius—Continued.

298.—Ruedemann, Bull. New York State Mus. 42, 1901, p. 541ff.—Weller, Geol. Sur. New Jersey, Pal., 3, 1903, p. 212, pl. 16, figs. 8, 9.—Dale, Bull. U. S. Geol. Sur., 242, 1904, p. 33.

Diplograptus (Glyptograptus) angustifolius Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 366-369, pl. 25, figs. 19, 20, text figs. 311-314.

Diplograptus (Graptolithus) angustifolius Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 206, figs.

Chazyan (Normanskill): Glenmont, Stockport, Lansingburg, etc., New York; Kicking Horse Pass, Canada; Silver Peak Quadrangle, Nevada; Arkansas; Quebec; New Jersey; Great Britain.

DIPLOGRAPTUS BARBATULUS Salter. See *Diplograptus foliaceus*.

Diplograptus basilicus (Elles and Wood).

Orthograptus basilicus Lapworth, Geol. Mag., 10, 1873, p. 134 (nom. nud.).

Diplograptus vulgatus var. *basilicus* Elles and Wood, Mon. British Grapt., pt. 6, 1907, p. 243, pl. 30, figs. 2a-d.

Ordovician: South Scotland (Lower Hartfell); Arkansas (Normanskill-Stringtown).

DIPLOGRAPTUS BICORNIS Geinitz. See *Climacograptus bicornis*.

DIPLOGRAPTUS BIMUCRONATUS Nicholson. See *Lasiograptus bimucronatus*.

DIPLOGRAPTUS CILIATUS Walcott. See *Glossograptus ciliatus*.

Diplograptus crassitestus Ruedemann.

Diplograptus crassitestus Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 354, 355, pl. 25, fig. 6, text figs. 299-300.

Richmond (Sylvan): Arbuckle Mountains, Oklahoma.

Cotypes.—Cat. No. 54266, U.S.N.M.

DIPLOGRAPTUS DENTATUS Lapworth. See *Diplograptus (Glyptograptus) euglyphus*.

Diplograptus dentatus (Brongniart).

Fucoides dentatus Brongniart, Hist. Veget. Foss., 1, 1828, p. 70, pl. 6, figs. 9-12.

Graptolithus pristiniiformis Hall, Geol. Sur. Can. Rep., 1857, p. 133; Canadian Nat. Geol., 3, 1858, p. 167.

Diplograptus pristiniiformis Hall, Geol. Sur. Can., dec. 2, 1865, p. 110ff, pl. 13, figs. 15-17.—Nicholson, Quar. Jour. Geol. Soc., 24, 1868, p. 140, pl. 5, figs. 14, 15.

Diplograptus dentatus Hopkinson and Lapworth, Quart. Jour. Geol. Soc. London, 31, 1875, p. 656, pl. 34, figs. 5a-k.—Emerson, Narrative Hall's 2d Arctic Exped. U. S. Navy Dept., 1879, p. 576.—Ami, Geol. Sur. Can. Rep., 2d ser., 3, pt. 2, 1889, p. 117k.—Gurley, Jour. Geol., 4, 1896, p. 298.—Elles, Quar. Jour. Geol. Soc., 54, 1898, p. 517.—Ruedemann, New York State Pal., Ann. Rep., 1902, p. 570; Mem. New York State Mus., 7, pt. 1, 1904, pp. 719-721, pl. 17, figs. 10-13, text fig. 100.—Grabau and Shiner, N. A. Index Fossils, 1, 1906, p. 34.

Canadian: Point Levis, Quebec (Levis, *Diplograptus dentatus* zone); Deepkill, Reneselaer and Columbia Counties, New York (Deepkill, *D. dentatus* zone); Arkansas; England (Skiddaw); Wales (Arenig); Sweden.

DIPLOGRAPTUS DISSIMILARIS Emmons. See *Diplograptus foliaceus*.

DIPLOGRAPTUS ETHERIDGII Hopkinson. See *Cryptograptus tricornis*.

Diplograptus (Glyptograptus) euglyphus (Lapworth).

Diplograptus dentatus Lapworth, Ann. Mag. Nat. Hist., 5th ser., 4, 1870, p. 61; Belfast, Nat. Field Club Rep. and Proc., 1, pt. 4, App., 1877, p. 132, pl. 1, fig. 13; Geol. Soc. Quar. Jour., 34, 1878.

Diplograptus (Glyptograptus) euglyphus Lapworth, Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 166, pl. 4, figs. 14a-e.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 369-370, pl. 25, figs. 22, 23, text figs. 315-316.

Diplograptus euglyphus Lapworth, Ann. Mag. Nat. Hist., 5th ser., 6, 1880, p. 21; Proc. and Trans. Roy. Soc. Can., 4, 1887, p. 177; Canadian Rec. Sci., 3, 1888, p. 141 (loc. occ.); Can. Geol. Surv. Rep., 1887-88, 2d ser., 3, pt. 1, p. 93.

Middle Ordovician: Great Britain (Glenkiln); Dease River, British Columbia (Griffin Cove, etc., Quebec; Glenmont, Speigletown, etc., New York (Nemanskill); Silver Peak Quadrangle, Nevada; Arkansas.

Plesiotype.—Cat. No. 54266, U.S.N.M.

Diplograptus euglyphus pygmæus Ruedemann.

Diplograptus euglyphus var. *pygmæus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 371, pl. 25, figs. 317, 318.

Trenton (Canajoharie): Near Lansingburg, New York.

Diplograptus foliaceus (Murchison).

?*Fucoides dentatus* Conrad, New York State Surv., 2d Ann. Rep., 1838, p. 114.—Vanuxem, *ibid.*, p. 283.

Graptolithus foliaceus Murchison, Sil. Syst., 1839, p. 694, pl. 26, fig. 3.—Portlock, Geol. Rep., 1843, p. 320, pl. 19, fig. 9.

Diprion foliaceus Harkness, Geol. Soc. London Quart. Jour., 7, 1850, pl. 1, fig. 13b.

Diplograptus foliaceus Geinitz, Die Grapt., 1852, pl. 1, figs. 29, 30.—Lapworth, Cat. West. Scotland Foss., 1876, p. 6, pl. 2, fig. 29; Belfast Nat. Field Club Rep. and Proc., 1, pt. 4, App., 1877, p. 133, pl. 6, fig. 18.—Linnarsson, Sver. Geol. Und., Ser. C., 31, 1879, p. 16ff.—Tullberg, Sver. Geol. Und., Ser. C., 41, 1880, p. 20; *ibid.*, 50, 1882, p. 20.—Lapworth, Proc. and Trans. Roy. Soc. Canada, 4, 1887, pp. 177ff.—Ami, Can. Geol. Surv. Rep., 2d ser., 3, pt. 2, 1888, p. 117K.—Geinitz, Mitth. k. Min. geol. praeh. Mus. Dresden, 9, 1890, p. 37, pl. A.—Gurley, Geol. Surv. Arkansas, Ann. Rep., 1892, 3, p. 404.—Barrois, Ann. Soc. Geol. du Nord, 20, 1892, p. 145.—Gurley, Jour. Geol., 4, 1896, p. 298.—Hall, Roy. Soc. Proc., 9, 1896, p. 185; *ibid.*, 10, 1897, p. 14; Geol. Mag., n. s., dec. 4, 6, 1899, p. 445.—Ruedemann, Bull. New State Mus., 42, 1901, p. 497ff.—Clark, Geol. Mag., 4th ser., 9, 1902, p. 498.—T. S. Hall, Geol. Surv. Victoria Rec., 1, pt. 1, 1902, p. 34f; Geol. Surv. New South Wales Rec., 7, pt. 2, 1902, p. 4, pl. 12, fig. 7.—Weller, Geol. Surv. New Jersey Pal., 3, 1902, p. 53.—Ami, Geol. Surv. Canada, Summ. Rep., 1906, p. 12.—Grabau and Shimer, N. A. Index Fossils 1, 1906, p. 33.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 341-346, pl. 24, figs. 1-8, pl. 25, figs. 1, 2, text figs. 279-282, pl. 25, figs. 7-9.

Fucoides simplex Emmons, Tac. Syst., 1844, p. 27, pl. 5, fig. 1; Agric. New York, 1, 1847, pl. 17, fig. 1.

Graptolithus pristis (part) Hall, Pal. New York, 1, 1847, p. 265, pl. 72, figs. 1-ac; Pal. New York, 3, 1859, p. 516, fig. 2; New York State Cab. Nat. Hist., 13th Ann. Rep., 1860, p. 60, fig. 2; Geol. Surv. Canada, Can. Org. Rem., dec. 2, 1865, p. 36, fig. 30; New York State Cab. Nat. Hist., 20th Ann. Rep., 1868, pp. 204, 205, fig. 2.

Graptolithus (Diplograptus) pristis White, Rep. Wheeler Surv., 4, 1875, p. 65, pl. 4, fig. 2.

Diplograptus foliaceus—Continued.

Diplograptus pristis Marcou, Geol. Map United States, 1853, p. 24, pl. 1, fig. 10.—Hopkinson, Micro. Club Jour., 1, 1869, pl. 8, fig. 11a.—Carruthers, Geol. Mag., 5, 1868, p. 130, pl. 5, figs. 13a-d.—Nicholson, Mon. British Grapt., 1872, fig. 22, p. 54; p. 58, fig. 26; p. 69, fig. 39A; p. 116, fig. 58.—Hopkinson and Lapworth, Geol. Soc. London Quart. Jour., 31, 1875, pp. 656-657, pl. 35, figs. 7a-g.—Walcott, Alb. Inst. Trans., 10, 1883 (adv. sheets, 1879, p. 34), p. 4 (loc. occ.).—Whitfield, Amer. Jour. Sci., 3d ser., 1883, 26, p. 380.—Tullberg, Zeitschr. d. deutsch. geol. Gesell., 35, 1883, p. 241.—Walcott, Bull. Geol. Soc. Amer., 1, 1890, p. 339.—Ruedemann (part), New York State Geol. Rep., 1897, p. 219, pl. 4.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 33, fig. 54.

Graptolithus folium et *G. pristis* Salter, Geol. Soc. London Quart. Jour., 5, 1849, p. 15, pl. 1, figs. 5, 6.

Diplograptus rugosus Emmons, Amer. Geol., 1, pt. 2, 1856, p. 105, pl. 1, fig. 26.—Lapworth, Ann. Mag. Nat. Hist., 5th ser., 5, 1880, p. 168.

Diplograptus dissimilaris Emmons, Amer. Geol., 1, pt. 2, 1855, p. 105, pl. 1, fig. 5.

Dicranograptus dissimilaris Gurley, Jour. Geol., 4, 1896, p. 95 (gen. ref.).

Diplograptus secalinus Hall, Pal. New York, 1, 1847, p. 267, pl. 72, figs. 2a-c.

Diplograptus barbatulus Salter, Mem. Geol. Surv. Great Britain, 3, 1866, pl. 2a, figs. 1e-d.

Graptolithus (*Diplograptus*) **hypniformis** White, Geogr. and Geol. Expl. West 100th Merid., Prel. Rep., 1874, p. 12; *ibid.*, 4, War Dep., 1877, p. 63, pl. 4, fig. 4a, b.

Diplograptus obliquus Emmons, Amer. Geol., 1, pt. 2, 1855, p. 106, pl. 1, fig. 22.

Diplograptus laciniata Emmons, Amer. Geol., 1, pt. 2, 1855, p. 236, pl. 1, fig. 24. Middle Ordovician: Great Britain (Glenkiln and Hartfell); Scandinavia, Australia, Nevada, Oklahoma, Arkansas, Canada, New York, etc. (Normanskill, etc.).

Plesiotype.—Cat. No. 8556, U.S.N.M. (Holotype of *G. hypniformis*).

DIPLOGRAPTUS FOLIACEUS Ruedemann (part). See *Glossograptus* (*Orthograptus*) *quadrimucronatus*.

Diplograptus foliaceus acutus Lapworth.

Graptolithus pristis Hall (?Hisinger), Pal. New York, 1, 1847, pl. 72, fig. 10, 1p.

Diplograptus foliaceus var. **acutus** (Lapworth MS.) Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 349-351, pl. 25, figs. 1, 2, text figs. 288-293.

Middle Ordovician: Stockport, etc., New York (Normanskill); Canada; Scotland (Glenkiln); Shropshire (Upper Llandeilo).

Diplograptus foliaceus alabamensis Ruedemann.

Diplograptus foliaceus var. **alabamensis** Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 352, pl. 25, fig. 3.

Chazy (Athens): Pratt's Ferry, Bibb County, Alabama.

DIPLOGRAPTUS FOLIACEUS mut. **AMPLEXICAULE** Gurley. See *Diplograptus* (*Glyptograptus*) *amplexicaulis*.

Diplograptus foliaceus incisus Lapworth.

Graptolithus pristis Hall (not Hisinger), Pal. New York, 1, 1847, pl. 72, fig. 11.

Diplograptus foliaceus var. **incisus** (Lapworth MS.) Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 347-349, pl. 24, figs. 198, text figs. 283-287.

Chazy: One-half mile below Little Mechin Point, Quebec; Stockport and Glenmont, New York (Normanskill).

Diplograptus foliaceus trifidus (Gurley).

Diplograptus trifidus Gurley, Geol. Surv. Ark. Rep., 3, 1890, 417, pl. 3, figs. 3, 4; Jour. Geol., 4, 1896, pp. 298, 307.

Diplograptus foliaceus var. *trifidus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 351, 352, fig. 295.

Chazyan (Normanskill): Arkansas.

Cotypes.—Cat. No. 54260, U.S.N.M.

DIPLOGRAPTUS FOLIACEUS VESPERTINUS Ruedemann. See *Diplograptus vespertinus*.

Diplograptus hudsonicus Nicholson.

Diplograptus Hudsonicus Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 2, fig. 15.

Cincinnatian (Pulaski): River Humber, Ontario.

Diplograptus inutilis Hall.

Diplograptus inutilis Hall, Geol. Surv. Canada, dec. 2, 1865, p. 111, pl. 13, fig. 14—Gurley, Jour. Geol., 4, 1896, p. 298.—Ruedemann, New York State Pal. Mus. Rep., 1902, p. 570; Mem. New York State Mus., 7, pt. 1, 1904, p. 721, pl. 14, figs. 12, 13.

Canadian: Point Levis, Quebec (*Levis*, *Diplograptus dentatus* zone); Deepkill, Rensselaer County, New York (*Deepkill*, *D. dentatus* zone).

DIPLOGRAPTUS LAXUS Ruedemann. See *Cryptograptus antennarius*.

Diplograptus longicaudatus Ruedemann.

Diplograptus longicaudatus Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, p. 723, pl. 16, fig. 11.

Canadian (*Deepkill*, *Diplograptus dentatus* zone): Deepkill, Rensselaer County, New York.

Diplograptus (Amplexograptus) macer Ruedemann.

Diplograptus (Amplexograptus) macer Ruedemann, Mem. New York State Mus., 162, 1912, p. 82, pl. 2, figs. 20, 21.

Trenton (Canajoharie): Minaville, New York.

DIPLOGRAPTUS MARCIDUS Walcott. See *Cryptograptus tricornis*.

Diplograptus (Mesograptus) mohawkensis Ruedemann.

Diplograptus (Mesograptus) mohawkensis Ruedemann, Bull. New York State Mus., 162, 1912, p. 80, pl. 2, figs. 18, 19.

Trenton (Canajoharie): Near Amsterdam and near Saratoga, New York.

DIPLOGRAPTUS MUCRONATUS Geinitz. See *Lasiograptus mucronatus*.

Diplograptus peosta Hall.

Graptolithus pristis (part) Hall, Pal. New York, 1, 1847, p. 72, figs. 1f, 1g.

Graptolithus (Diplograptus) peosta Hall, Geol. Surv. Wisconsin Rep., 1861, p. 17.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 47, pl. 5, fig. 12.

Diplograptus peosta Hall, Geol. Wisconsin, 1, 1862, p. 430; 20th Rep. New York State Cab. Hist., 1868, p. 223.—Gurley, Jour. Geol., 4, 1896, p. 298.—James, Amer. Geol., 5, 1890, p. 354.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 372–374, pl. 25, fig. 17, text figs. 319–322; Bull. New York State Mus., 162, 1912, p. 83, fig. 23, pl. 2, fig. 17.

Diplograptus pristis Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1897, p. 81, fig. 2.

Diplograptus peosta—Continued.

Diplograptus amplexicaulis Whitfield and Hovey (part), Bull. Amer. Mus. Nat. Hist., 11, pt. 1, 1898, pp. 20-21.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 561.

Richmond (Maquoketa): Graf, etc., Iowa; Wisconsin; Illinois; Minnesota; etc.

DIPLOGRAPTUS PRISTINIFORMIS Ruedemann. See *Lasiograptus* (*Thysanograptus*) *eucharis*.

DIPLOGRAPTUS PRISTINIFORMIS Hall (part). See *Diplograptus* *dentatus*.

DIPLOGRAPTUS PRISTIS Ruedemann (part). See *Glossograptus* (*Orthograptus*) *quadrimucronatus*.

DIPLOGRAPTUS PRISTIS Nicholson. See *Diplograptus foliaceus*.

DIPLOGRAPTUS PRISTIS Winchell and Schuchert. See *Diplograptus peosta*.

DIPLOGRAPTUS PRISTIS Hall (part). See *Diplograptus foliaceus vespertinus*.

DIPLOGRAPTUS PUTILLUS Hall. See *Climacograptus putillus*.

DIPLOGRAPTUS QUADRMUCRONATUS Nicholson. See *Glossograptus* (*Orthograptus*) *quadrimucronatus*.

DIPLOGRAPTUS RUEDEMANNI Gurley. See *Lasiograptus* (*Thysanograptus*) *eucharis*.

DIPLOGRAPTUS RUGOSUS Emmons. See *Diplograptus foliaceus*.

DIPLOGRAPTUS SECALINUS Eaton. See *Diplograptus foliaceus*.

DIPLOGRAPTUS? SEXTANS McCoy. See *Dicellograptus sextans*.

DIPLOGRAPTUS SPINULOSUS Walcott. See *Glossograptus ciliatus*.

DIPLOGRAPTUS TERETIUSCULUS var. *PUTILLUS* Frech. See *Climacograptus putillus*.

DIPLOGRAPTUS TRICORNIS Carruthers. See *Cryptograptus tricornis*.

DIPLOGRAPTUS TRIFIDUS Gurley. See *Diplograptus foliaceus trifidus*.

Diplograptus vespertinus (Ruedemann).

Diplograptus pristis (part) Hall, Pal. New York, 1, 1847, pl. 72, figs. 1, 1a, 1b, 1k, 1l.

Diplograptus foliaceus mut. *vespertinus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 352-354, pl. 25, figs. 4, 5, 18, text figs. 296-298.

Diplograptus vespertinus Ruedemann, Bull. New York State Mus., 162, 1912, p. 83.

Chazyan (Normanskill): Van Schaick Island, etc., New York.

Trenton (Canajoharie): Mohawk Valley, New York.

DIPLOGRAPTUS VULGATUS var. *ACUTUS* Elles and Wood. See *Diplograptus acutus*.

DIPLOGRAPTUS VULGATUS var. *BASILICUS* Elles and Wood. See *Diplograptus basilicus*.

DIPLOGRAPTUS WHITFIELDI Nicholson. See *Glossograptus whitfieldi*.

DIPLOPHYLLUM Hall. See *Diphyphyllum* Lonsdale.

DIPLOSTENOPORA Ulrich and Bassler. Genotype: *Escharopora siluriana* Weller.

Diplostenopora Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 276.

Diplostenopora siluriana (Weller).

Escharopora siluriana Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 225, pl. 12, figs. 6-7; pl. 19, figs. 8, 9.

Diplostenopora siluriana Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 277, pl. 45, figs. 3-6; pl. 48, figs. 1-3; pl. 52, figs. 3-4.

Helderbergian: Two miles south Tristates, New York (Decker Ferry); One Valley, etc., near Cumberland, Maryland (Keyser).

DIPLOTRYPA Nicholson (part). See *Mesotrypa* Ulrich.

DIPLOTRYPA Nicholson.

Genotype: *Favosites petropolitanus* Pander.

Diplotrypa Nicholson, Pal. Tab. Corals, 1879, p. 292; Genus *Monticulipora*, 1881, pp. 101, 155.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 153.—Foord, Contr. Micro-Pal. Cambro-Sil., 1883, p. 13.—Roemer, Leth. geol., 1, Leth. Pal., 1883, p. 472.—Miller, N. A. Geol. Pal., 1889, p. 187.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 378, 457.—Rominger, Amer. Geol., 6, 1890, pp. 116-119.—Ulrich, Geol. Minnesota, 3, 1893, p. 285; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 275; also (not Ulrich) p. 104 (in part).—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, p. 36.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 47; Zittel-Eastman Textb. Pal., 1913, p. 338; Bull. U. S. Nat. Mus., 77, 1911, pp. 312, 313.

Callopora (not Hall) Dybowski, Die Chætetiden d. Ostb. Silur-Form., 1877, p. 106.

Diplotrypa? dubia Ulrich.

Diplotrypa? dubia Ulrich, Geol. Surv. Illinois, 8, 1890, p. 459, pl. 33, figs. 3-5b. *Monticulipora dubia* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 182.

Dianulites dubia Miller, N. A. Geol. Pal., 2d App., 1897, p. 728 (gen. ref.).

Richmond (Fernvale): Wilmington, Illinois.

Sections of *holotype*.—Cat. No. 43390, U.S.N.M.

DIPLOTRYPA *INFIDA* Ulrich. See *Mesotrypa infida*.

Diplotrypa limitaris Ulrich.

Diplotrypa limitaris Ulrich, Geol. Minnesota, 3, 1893, p. 286, fig. 18.—Sardeson, Jour. Geol., 9, 1901, p. 8, pl. A, figs. 3, 4.

Dianulites limitaris Miller, N. A. Geol. Pal., 2d App., 1897, p. 728 (gen. ref.).

Trenton (Prosser): Goodhue County, Minnesota.

Holotype.—Cat. No. 43534, U.S.N.M.

DIPLOTRYPA *MILLERI* Ulrich. See *Mesotrypa nummiformis*.

Diplotrypa neglecta Ulrich.

Diplotrypa neglecta Ulrich, Geol. Minnesota, 3, 1893, p. 287, fig. 19.

Dianulites neglecta Miller, N. A. Geol. Pal., 2d App., 1897, p. 728 (gen. ref.).

Trenton (Prosser): Hader, Minnesota.

Holotype.—Cat. No. 43533, U.S.N.M.

DIPLOTRYPA *PATELLA* Ulrich. See *Mesotrypa patella*.

DIPLOTRYPA *QUEBECENSIS* Ami. See *Mesotrypa quebecensis*.

DIPLOTRYPA *REGULARIS* Foord. See *Mesotrypa regularis*.

***Diplotrypa walkeri* Bassler.**

Diplotrypa walkeri Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 47-48, pl. 16, figs. 1-5; pl. 25, fig. 4.

Clinton (Rochester): Lockport and Rochester, New York; Grimsby, Ontario.

Cotypes.—Cat. No. 35527, U.S.N.M.

***Diplotrypa westoni* Ulrich.**

Diplotrypa westoni Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 30, pl. 8, figs. 4-4b; Zittel's Textb. Pal. (Engl. ed.), 1896, fig. 457 (p. 274).—Whiteaves, Pal. Foss., 3, pt. 3, 1897, p. 163.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 323, fig. 201; Zittel-Eastman Textb. Pal., 1913, p. 338.

Black River or Richmond: Big Island, Lake Winnipeg, Manitoba.

Ordovician (Chamop): Nittsjo Rätvik, Dalarne, Sweden, and south of Böda-hamn, island of Öland, Baltic Sea.

Part of *holotype*.—Cat. No. 43810, U.S.N.M.

DIPRION FOLIACEUS Harkness. See *Diplograptus foliaceus*.

DISCINA Hall. See *Orbiculoidea* D'Orbigny.

DISCINA CIRCE Billings. See *Orbiculoidea lamellosa*.

DISCINA CLARA Spencer. See *Schizotreta tenuilamellata*.

DISCINA CONCORDENSIS Sardeson. See *Schizotreta pelopea*.

DISCINA DEFORMIS Lincklaen. See *Archinacella deformata*.

***Discina*? *fletcheri* Ami.**

Discina fletcheri Ami, Proc. and Trans. Nova Scotian Inst. Sci., 8, 1895, p. 412. Silurian: Antigonish County, Nova Scotia.

DISCINA FORBESI Nicholson. See *Schizotreta tenuilamellata*.

DISCINA LAMELLOSA Hitchcock. See *Orbiculoidea lamellosa*.

***Discina*? *novascotica* Ami.**

Discina novascotica Ami, Proc. and Trans. Nova Scotian Inst. Sci., 8, 1895, p. 412.

Silurian: Antigonish County, Nova Scotia.

***Discina*? *orientalis* Ami.**

Discina orientalis Ami, Proc. and Trans. Nova Scotian Inst. Sci., 8, 1895, p. 413. Silurian: Antigonish County, Nova Scotia.

DISCINA PARMULATA Lincklaen. See *Orbiculoidea parmulata*.

DISCINA PELOPEA Billings. See *Schizotreta pelopea*.

DISCINA SOLITARIA Ringueberg. See *Schizotreta tenuilamellata*.

***Discina sublamellosa* Ulrich.**

Discina sublamellosa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 97, pl. 4, fig. 11.—Miller, N. A. Geol. Pal., 1889, p. 344.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 218.

Eden (Economy): Covington, Kentucky.

Observation.—Probably not a brachiopod; possibly a pelecypod.

DISCINA TENUILAMELLATA var. *SUBPLANA* Hall. See *Orbiculoidea subplana*.

DISCINA TENUISTRIATA Ulrich. See *Orbiculoidea tenuistriata*.

DISCINA TRUNCATA Emmons. See *Orbiculoidea lamellosa*.

DISCINA VANUXEMI Hall. See *Orbiculoidea vanuxemi*.

DISCOCERAS Barrande. Genotype: *Clymenia antiquissima* Erckm.
Discoceras Barrande, *Cephalopodes*; Ext. Syst. Sil. du Centre Boheme, 157, p. 95.—Angelin, *Fragmenta Silurica*, 1880, p. 9.—Zittel, *Handb. Pal.*, 2, 1881, p. 377.—Remele, *Zeits. d. d. geol. Gesell.*, 23, 1886, p. 468.—Schöder, *Abhandl. von Dames u. Kayser, Neue Folge*, 1, Heft. 4, Jena, 1891, p. 3.—Hyatt, *Proc. Amer. Phil. Soc.*, 32, 1894, p. 500.—Koken, *Die Leithen*, Leipzig, 1896, p. 51.—Miller, *N. A. Geol. Pal.*, 2d, App., 1897, p. 772.—Gibbs and Shimer, *N. A. Index Fossils*, 2, 1910, p. 72.

Discoceras canadense Whiteaves.

Discoceras Canadense Whiteaves, *Pal. Foss., Geol. Surv. Canada*, 3, pt. 1, 1884, p. 227, pl. 22, figs. 3, 3a.

Black River or Richmond: Little Black Island; Lake Winnipeg, Canada.

DISCOCERAS EATONI Schroeder. See *Schroederoceras eatoni*.

Discoceras graftonense (Meek and Worthen).

Lituities Graftonensis Meek and Worthen, *Proc. Acad. Nat. Sci. Philadelphia*, 1870, p. 51; *Geol. Surv. Illinois*, 6, 1875, p. 507, pl. 25, fig. 1.—Newell, *Proc. Boston Soc. Nat. Hist.*, 1888, 23, p. 485 (loc. occ.).—Whiteaves, *Pal. Foss. Geol. Surv. Canada*, 3, pt. 2, 1895, p. 105.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 72.

Lituities multicostatus Whitfield, *Ann. Rep. for 1879, 1880*, p. 67; *Geol. Wisconsin*, 4, 1882, p. 303, pl. 20, fig. 7.—Newell, *Proc. Boston Soc. Nat. Hist.*, 23, 1888, p. 486 (loc. occ.).

Trocholites multicostatus Whiteaves, *Pal. Foss., Geol. Surv. Canada*, 3, pt. 1, 1884, p. 36, pl. 6, figs. 1, 1a.—Lesley, *Geol. Surv. Pennsylvania, Rep.*, 1, 1880, p. 1229, figs.

Niagaran: Grafton, Illinois; Waukeesa, Wisconsin; Indiana; Elora and Hespeler, Ontario (Guelph).

DISCOCERAS INTERNISTRIATUM Schroeder. See *Trocholites internistriatus*.

Discoceras marshi (Hall).

Lituities marshii Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 36, pl. 16 (7), figs. 6, 7; rev. ed., 1870, p. 404, pl. 16, figs. 6, 7.—Nettelroth, *Kentucky Foss. Shells*, *Geol. Surv. Kentucky*, 1889, p. 195, pl. 30, fig. 1.—Kink and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 474, pl. 21, fig. 4.

Discoceras marshii Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 72, fig. 1284.

Niagaran: Kankakee, Illinois; Louisville, Kentucky; Wabash, Indiana. *Pteriotype*.—Cat. No. 51378, U.S.N.M.

Discoceras ortonii (Meek).

Lituities? Ortoni Meek, *Geol. Surv. Ohio, Pal.*, 1, 1873, p. 186, pl. 15, fig. 4 (Gyroceras? Ortoni at end of description).

Discoceras ortonii Miller, *N. A. Geol. Pal.*, 2d App., 1897, p. 773 (gen. rel.).
 Niagaran (Guelph): Greenville, Darke County, Ohio.

DISCOLITES Emmons. See *Microceras* Hall.

DISCOLITES MINUTUS Emmons. See *Microceras inornatum*.

ISCOPHYCUS Walcott.Genotype: *D. typicale* Walcott.

Discophycus Walcott, Trans. Albany Inst., 10, 1883, p. 19 (adv. sheets, 1879).—
Miller, N. A. Geol. Pal., 1889, p. 117.

Discophycus typicale Walcott.

Discophycus typicalis Walcott, Trans. Albany Inst., 10, 1883, p. 19, pl. 2, figs.
18, 18a (adv. sheets, 1879).—James, Jour. Cincinnati Soc. Nat. Hist., 7,
1884, p. 128, pl. 5, fig. 4.

Utica: Trenton, Oneida County, New York.

DISCOPHYLLUM Hall.Genotype: *D. peltatum* Hall.

Discophyllum Hall, Pal. New York, 1, 1847, p. 277

Discophyllum peltatum Hall.

Discophyllum peltatum Hall, Pal. New York, 1, 1847, p. 277, pl. 75, fig. 3.

Chazyan (Normanskill) or Trenton (Snake Hill): Near Troy, New York.

DISCOSORUS Hall.Genotype: *D. conoideus* Hall

Discosorus Hall, Pal. New York, 2, 1852, p. 99, pl. 28.—Woodward, Men. Mol-
lusca, pt. 3, 1856, p. 449.—Hall, 12th Rep. New York State Cab. Nat. Hist.,
1859, p. 81.—Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1883, p. 272.—Foord,
Cat. Foss. Ceph. British Mus., 1, 1888, p. 194.—Miller, N. A. Geol. Pal., 1889,
p. 436.

Discosorus conoideus Hall.

Columns of circular discs, etc., Bigsby, Trans. Geol. Soc. London, ser. 2, 1, 1824,
p. 204, pl. 30, figs. 4, 6.

Discosorus conoideus Hall, Geol. Lake Sup. Land Dist., Foster and Whitney's
Rep., 1851, p. 222, pl. 34, figs. 2, 3; Pal. New York, 2, 1852, p. 99, pl. 28,
figs. 13a-c.—Whitfield, Geol. Wisconsin, 4, 1882, p. 299, pl. 20, fig. 6.—
Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 196, fig. 25.

Orthoceras? (*Discosorus*) *conoideus* Barrande, Syst. Sil. du Centre Boheme, 2,
pt. 3, 1864, p. 750, pl. 232, 437, 474.—Foerste, Proc. Boston Soc. Nat. Hist.,
24, 1889, p. 286; Geol. Surv. Ohio, Pal., 7, 1893, p. 546, pl. 36, fig. 8.

Gomphoceras conoideum Whitfield and Hovey, Bull. Amer. Mus. Nat. Hist., 11,
pt. 2, 1899, p. 172. (Regarded as internal cast of siphon.)

Silurian: Ontario and Lockport, New York (Lower Clinton); Todds Fork, Clin-
ton County, Ohio (Brassfield); Ashford, etc., Wisconsin; Drummond Island,
Lake Huron (Niagaran).

Discosorus gracilis Foord.

Discosorus ——— Barrande, Syst. Sil. Boheme, 2, suppl. 1877, pl. 474, figs. 9, 10.

Discosorus gracilis Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 198, fig. 26.

Niagaran: Drummond Island, Lake Huron.

Discosorus remotus Foord.

Columns of circular discs, etc., Bigsby, Trans. Geol. Soc., 2d ser., 1, 1824, p. 204,
pl. 30, fig. 7.

Discosorus remotus Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 197.

Niagaran: Drummond Island, Lake Huron.

DISCOTRYPA Ulrich.Genotype: *Chaetetes elegans* Ulrich.

Discotrypa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 155.—Miller, N.
A. Geol. Pal., 1889, p. 300.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 378.—

Nickles and Basler, Bull. U. S. Geol. Surv., 173, 1900, p. 30.

Discotrypa elegans (Ulrich).

Chaetetes elegans Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 139, p. 12, figs. 12, 12a.

Discotrypa elegans Ulrich, *ibid.*, 6, p. 163, pl. 7, fig. 1-1b.

Monticulipora elegans James and James, *ibid.*, 10, 1888, p. 165.—J. F. James, *ibid.*, 16, 1894, p. 180.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

Holotype.—Cat. No. 43653, U.S.N.M.

DISTACODUS Hinde.

Genotype: *Machairodus incurvus* Pander.

Machairodus Pander, Mon. Foss. Fische Sil. Syst., 1856, p. 23.

Distacodus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 357. (*Proposed for Machairodus* Pander, preoccupied by Kaup.)—Miller, N. A. Geol. Pal., 1889, p. 518.

Distacodus incurvus (Pander).

Machairodus incurvus Pander, Mon. Foss. Fische Sil. Syst., 1856, p. 23, tab. 1, fig. 22.

Distacodus incurvus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 357, pl. 15, fig. 9.

Middle Ordovician: Esthonia, Russia.

Maysville (Pulaski): Garrison Common, near Toronto, Ontario.

DITECHOLASMA Simpson.

Genotype: *Petraia fanningana* Safford.

Ditecholasma Simpson, Bull. New York State Mus., 39, 1900, p. 200.

Ditecholasma fanninganum (Safford).

Petraia fanningana Safford, Geol. Tennessee, 1869, p. 320, pl. 5, (H), figs. 3a-g.—

Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 627, figs.

Duncanella fanningana Girty, 19th Ann. Rep. U. S. Geol. Surv., 1899, p. 552.

Ditecholasma fanninganum Simpson, Bull. New York State Mus., 39, 1900, p. 201, figs. 5, 6.

Ditecholasma (*Petraia*) *fanningana* Foerste, Jour. Geol., 11, 1903, p. 713 (loc. occ.).

Niagaran (Brownspport): Decatur, Perry, and Wayne Counties, Tennessee.

DOLABRA CARINATA Meek. See *Whitella carinata*.**DOLABRA STERLINGENSIS** Meek and Worthen. See *Whitella sterlingensis*.**DOLICHOMETOPUS** Angelin.

Genotype: *D. suecicus* Angelin.

Dolichometopus Angelin, Pal. Scandinavica, 3d ed., Holmice, 1878, p. 72.—

Woodward, Geol. Mag., dec. 3, 1, 1884, p. 343.—Zittel, Handb. Pal., 2, 1885, p. 599.—Miller, N. A. Geol. Pal., 1889, p. 545.—Koken, Die Leitfossilien,

Leipzig, 1896, p. 15.—Matthew, Trans. Royal Soc. Canada, 2d ser., 3, sec. 4, 1897, pp. 184, 195.—Walcott, Cam. Faunas China, Yearb. Carnegie Inst., 1,

1913, p. 215.—Clarke, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 783.

Amphoton Lorenz, Zeit. deutsch. geol. Gesell., 58, 1906, p. 75. (Genotype: *A. steinmanni* Lorenz.)

Dolichometopus(?) convexus Billings.

Dolichometopus? *convexus* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 269, fig. 253.

Canadian (Quebec-G): Port aux Choix, Newfoundland.

Dolichometopus(?) gibberulus Billings.

Dolichometopus? *gibberulus* Billings, Pal. Foss., 1, 1865, Geol. Surv. Canada, p. 269, fig. 254.

Canadian (Quebec-G): Port aux Choix, Newfoundland.

***Dolichometopus mccoysi* (Walcott).**

Barrandia? McCoyi Walcott, Mono. U. S. Geol. Surv., 8, 1884, p. 96, pl. 12, fig. 5.

Niobe Maccoyi Frech, Leth. geog., Leth. Pal., 2, 1897, pl. 1b, fig. 2.

Upper Pogonip: Ridge east of Hamburg Ridge, Eureka District, Nevada.

Cotype.—Cat. No. 24650, U.S.N.M.

***Dolichometopus* (?) *rarus* Billings.**

Dolichometopus? *rarus* Billings, Pal. Foss., 1, 1865, p. 352, text fig. 338.

Canadian (Beekmantown): Township of Oxford, Canada.

***DOLICHOPTERUS* Hall.**

Genotype: *D. macrocheirus* Hall.

Dolichopterus Hall, Pal. New York, 3, 1859, p. 414.—Zittel, Handb. Pal., 2, 1885,

p. 651.—Miller, N. A. Geol. Pal., 1889, p. 545.—Laurie, Nat. Sci., 3, 1893,

p. 125.—Clarke, Zittel-Eastman Textb. Pal., 1, 1900, p. 676.—Grabau, Bull.

Buffalo Soc. Nat. Sci., 7, 1901, p. 230; Bull. New York State Mus., 45, 1901,

p. 230.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 410.—Clarke

and Ruedemann, Mem. New York State Mus., 14, 1912, p. 258.

***Dolichopterus breviceps* Clarke and Ruedemann.**

Dolichopterus breviceps Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 414, fig. 98.

Chazy (Normanskill): Catskill, New York.

***Dolichopterus frankfortensis* Clarke and Ruedemann.**

Dolichopterus frankfortensis Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 268, pl. 83, figs. 9-14.

Trenton (Schenectady): Schenectady, Aqueduct, Rotterdam Junction, and Duaneburg, New York.

***Dolichopterus latifrons* Clarke and Ruedemann.**

Dolichopterus latifrons Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 269, pl. 83, figs. 15-16.

Trenton (Schenectady): Schenectady, New York.

***Dolichopterus macrocheirus* Hall.**

Dolichopterus macrocheirus Hall, Pal. New York, 3, 1859, p. 414, pl. 83, fig. 1, pl. 83a, fig. 1.—Pohlman, Bull. Buffalo Soc. Nat. Sci., 4, 1881, p. 20.—Grabau, Bull. New York State Mus., 45, 1901, p. 230; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 230.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 410, fig. 1711.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 262, pl. 35, fig. 1; pls. 40-45, text fig. 61.

Cayuga (Bertie): Williamsville, Litchfield, etc., New York.

Plesiotype.—Cat. No. 60052, U.S.N.M.

***Dolichopterus otisius* (Clarke).**

Pterygotus? *otisius* Clarke, Bull. New York State Mus., 107, 1907, p. 308, pl. 6, figs. 6, 7.

Dolichopterus otisius Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 270, pl. 46, figs. 1-8.

Medinan (Shawangunk): Otisville, New York; Delaware Water Gap, Pennsylvania.

***Dolichopterus siluriceps* Clarke and Ruedemann.**

Eusarcus scorpionis Pohlman, Bull. Buffalo Soc. Nat. Sci., 5, 1886, p. 30, pl. 3, fig. 3.

Dolichopterus siluriceps Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 273, pl. 26, fig. 3.

Cayuga (Bertie): Williamsville, New York.

Dolichopterus stylonuroides Clarke and Ruedemann.

Dolichopterus stylonuroides Clarke and Ruedemann, *Mem. New York State Mus.*, 14, 1912, p. 276, pl. 46, figs. 9-14.

Medinan (Shawangunk): Otisville, New York.

Dolichopterus(?) testudineus Clarke and Ruedemann.

Dolichopterus(?) testudineus Clarke and Ruedemann, *Mem. New York State Mus.*, 14, 1912, p. 274, pl. 57, figs. 1, 2.

Cayugan (Bertie): Near Crane's Corners, Litchfield, Herkimer County, New York.

DONACIORINITES BIPARTITUS Troost. See *Erisocrinus?* *bipartitus*.

DOUVILINA Hall and Clarke. See *Stropheodonta* Hall.

DREPANELLA Ulrich.

Genotype: *D. crassinoda* Ulrich.

Drepanella Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 13, 1890, pp. 117, 118 (*Drepanella* in error).—Miller, *N. A. Geol. Pal.*, 1st, App., 1892, p. 707.—Ulrich, *Geol. Minnesota*, 3, pt. 2, 1894, p. 670; *Zittel-Eastman Textb. Pal.*, 1, 1900, p. 644.—Ulrich and Bassler, *Proc. U. S. Nat. Mus.*, 35, 1908, p. 311.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 349.

Drepanella ampla Ulrich.

Drepanella ampla Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 13, 1890, p. 120, pl. 5, fig. 2.—Ulrich and Bassler, *Proc. U. S. Nat. Mus.*, 35, 1908, pl. 41, fig. 2.

Stones River (?Ridley): Bottom of gorge, High Bridge, Kentucky.

Holotype.—Cat. No. 41375, U.S.N.M.

DREPANELLA AMPLA var. **ELONGATA** Ulrich (1894). See *Drepanella crassinoda*.

Drepanella bigeneris Ulrich.

Drepanella bigeneris Ulrich, *Geol. Minnesota*, 3, pt. 2, 1894, p. 672, pl. 44, figs. 20-22.—Ulrich and Bassler, *Proc. U. S. Nat. Mus.*, 35, 1908, pl. 41, figs. 1-3.

Black River (Platteville): Minneapolis, Minnesota.

Cotypes.—Cat. No. 41379, U.S.N.M.

DREPANELLA BILATERALIS Ulrich. See *Scofieldia bilateralis*.

Drepanella crassinoda Ulrich.

Drepanella crassinoda Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 13, 1890, p. 118, pl. 8, figs. 1a-c.—Ulrich and Bassler, *Proc. U. S. Nat. Mus.*, 35, 1908, p. 291, fig. 18, pl. 41, figs. 4-6.—Grabau and Shimer, *N. A. Index Fossils*, 1910, p. 349, fig. 16571-n.—Bassler, *Bull. Virginia Geol. Surv.*, 2a, 1909, pl. 23, fig. 12; *Zittel-Eastman Textb. Pal.*, 1913, p. 738, fig. 14250.

Drepanella ampla var. *elongata* (in error for *D. crassinoda*) Ulrich, *Geol. Minnesota*, 3, pt. 2, 1894, p. 670, fig. 48a-c.

Black River (Lowville): High Bridge, Kentucky; Virginia; Tennessee.

Holotype.—Cat. No. 41377, U.S.N.M.

DREPANELLA CRASSINODA **NITIDA** Ulrich. See *Drepanella nitida*.

Drepanella elongata Ulrich.

Drepanella elongata Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 13, 1890, p. 121, pl. 8, figs. 5a, b.—Ulrich and Bassler, *Proc. U. S. Nat. Mus.*, 35, 1908, pl. 41, figs. 10, 11.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 349, fig. 16570.

Drepanella macra Ulrich, *Geol. Minnesota*, 3, pt. 2, 1894, p. 670, fig. 48d (not 48c = *D. crassinoda*).

Stones River (?Ridley): Bottom of gorge, High Bridge, Kentucky.

Holotype.—Cat. No. 41376, U.S.N.M.

DREPANELLA MACRA Ulrich (1894). See *Drepanella elongata*.

Drepanella macra Ulrich.

Drepanella macer Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1894, p. 119, pl. 8, figs. 4a-c.

Drepanella macra Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 291, fig. 17, pl. 41, figs. 12-14.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 350, fig. 1664a-c.

Stones River (Lebanon): Lavergne, Lebanon, and Columbia, Tennessee.

Holotype.—Cat. No. 41373, U.S.N.M.

Drepanella nitida (Ulrich).

Drepanella crassinoda nitida Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 119, pl. 8, figs. 3a, b.

Drepanella nitida Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 291, fig. 19, pl. 41, figs. 7, 8.

Black River (Lowville): High Bridge, Kentucky.

Holotype.—Cat. No. 41378, U.S.N.M.

Drepanella richardsoni (Miller).

Beyrichia richardsoni Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 347, fig. 40; N. A. Geol. Pal., 1889, p. 535, fig. 978.

Drepanella richardsoni Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 117.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 292, fig. 23, pl. 41, fig. 15.

Richmond (Whitewater): Wilmington, Ohio.

Plasiotype.—Cat. No. 41407, U.S.N.M.

Drepanella richardsoni canadensis Ulrich.

Drepanella richardsoni var. *canadensis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 118.

Richmond: Oakville, Ontario.

Cotypes.—Cat. No. 41374, U.S.N.M.

Drepanella symmetrica (Emerson).

Beyrichia symmetrica Emerson, Narrative Hall's 2d Arctic Exped., U. S. Navy Dep., 1879, p. 581, fig. 9.

Richmond: Frobisher Bay, Baffin Land.

Plasiotype.—Cat. No. 60729, U.S.N.M.

DREPANODUS Pander.

Genotype: *D. arcuatus* Pander.

Drepanodus Pander, Mon. d. foss. Fische Sil. Syst., 1856, p. 20.—Miller, N. A. Geol. Pal., 1889, p. 518.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 245.

Drepanodus arcuatus Pander.

Drepanodus arcuatus Pander, Mon. foss. Fish. Sil. Syst., 1856, p. 20, tab. 1, figs. 2, 4, 5.—Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 357, pl. 15, figs. 7, 8.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 245, fig. 1537, d, e.

Middle Ordovician: Esthonia, Russia.

Maysville (Pulaaki): Garrison Common, near Toronto, Ontario.

DREPANOPTERUS Laurie. See *Stylonurus* subgenus *Drepanopterus*.

DRYMOPORA Davis. See *Syringopora* subgenus *Drymopora*.

DRYMOTRYPA Ulrich. See *Pseudohornera* Roemer.

DUNCANELLA Nicholson.Genotype: *D. borealis* Nicholson.

Duncanella Nicholson, Ann. Mag. Nat. Hist., 4th ser., 13, 1874, p. 333.—Zittel, Handb. Pal., 1, 1879, p. 226.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 396.—Miller, N. A. Geol. Pal., 1889, p. 187.—Frech, Palaeontographica, 37, 1890, p. 81.—Sherzer, Amer. Geol., 7, 1891, pp. 278-283.—Girty, 19th Ann. Rep. U. S. Geol. Surv., 1899, p. 556; Zittel-Eastman Textb. Pal., 1, 1900, p. 74; 2d ed., 1913, p. 82.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 76.

Duncanella borealis Nicholson.

Duncanella borealis Nicholson, Ann. Mag. Nat. Hist., 4th ser., 13, 1874, p. 334, fig.—Miller, N. A. Geol. Pal., 1889, p. 187, fig. 172.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 76.

Streptelasma (*Duncanella*) *borealis* Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 106, pl. 5, figs. 7, 8; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 226, pl. 1, figs. 7-10; pl. 4, figs. 7, 8.

Streptelasma borealis Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1064, figs.

Streptelasma minima Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, pl. 5, figs. 7, 8.

Niagaran (Waldron): Waldron, Indiana; Newsom, Tennessee.

Clinton (Osgood): Osgood, Indiana.

DUNCANELLA FANNINGANA Girty. See *Ditoecholasma fanninganum*.

DYBOWSKIA Waagen and Pichl. See *Fistulipora* McCoy.

DYBOWSKIELLA Waagen and Wentzel. See *Fistulipora* McCoy.

DYERIA Ulrich.Genotype: *Cyrtolites costatus* James.

Dyeria Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1044.

Dyeria costata (James).

Cyrtolites costatus James, Amer. Jour. Sci., 3d ser., 3, 1872, p. 26.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 150, pl. 13, figs. 1a, b, c.

Bucania costatus Miller, Jour. Cincinnati Quart. Jour. Sci., 1, 1874, p. 308.

Dyeria costata, Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1044, text fig. 8.—Grabau, Amer. Nat., 36, 1902, p. 939.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

Plesiotypes.—Cat. No. 45796, U.S.N.M.

DYSTACTOPHYCUS Miller and Dyer.Genotype: *D. mammillanum* Miller and Dyer.

Dystactophycus Miller and Dyer, Cont. to Pal., 2, 1878, p. 2.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 163.—Miller, N. A. Geol. Pal., 1, 1889, p. 117.

Dystactophycus mammillanum Miller and Dyer.

Dystactophycus mammillanum Miller and Dyer, Cont. to Pal., 2, 1878, p. 3, pl. 3, fig. 4.—James, Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 125.—Miller, N. A. Geol. Pal., 1889, p. 118, fig. 34.

Maysville (Corryville): Near Morrow, Ohio.

DYSTACTOSPONGIA Miller.Genotype: *D. insolens* Miller.

Dystactospongia Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 42.—Miller, N. A. Geol. Pal., 1889, p. 158.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1, 1891, p. 70.

Dystactospongia insolens Miller.

Dystactospongia insolens Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 43, pl. 2, figs. 2a-b.—James, *ibid.*, 14, 1891, p. 70.—Miller, N. A. Geol. Pal., 1889, p. 158, fig. 102.

Stromatopora insolens James, Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 250. Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

Dystactospongia madisonensis Foerste.

Dystactospongia madisonensis Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 302, pl. 9, figs. 1, 5; *ibid.*, 16, 1910, p. 20.

Richmond (Whitewater-Saluda): Madison, Osgood, and Versailles, Indiana.

Dystactospongia minima Ulrich.

Dystactospongia minima Ulrich, Amer. Geol., 3, 1889, p. 243.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1, 1891, p. 70.

Richmond (Waynesville): Hanover, Butler County, Ohio.

Holotype.—Cat. No. 46553, U.S.N.M.

Dystactospongia minor Ulrich and Everett.

Dystactospongia minor Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 278, pl. 8, figs. 3a-b.—Hayes and Ulrich, U. S. Geol. Surv., folio 95, 1893, illust. sheet, figs. 48, 49.

Black River: Dixon, Illinois (Platteville); Columbia, etc., Tennessee (Carters). Sections of *holotype* and *plesiotypes*.—Cat. Nos. 46554, 35404, U.S.N.M.

Dystactospongia rudis Ulrich and Everett.

Dystactospongia rudis Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 279, pl. 8, figs. 4, 4a.

Black River (Platteville): Dixon, Illinois.

Sections of *holotype*.—Cat. No. 46555, U.S.N.M.

EATONIA Hall.

Genotype: *Atrypa peculiaris* Conrad.

Eatonia Hall, 10th Rep. New York State Cab. Nat. Hist., 1857, p. 90; 12th Rep., *ibid.*, 1859, p. 35; Pal. New York, 3, 1859, p. 432.—Billings, Proc. Portland Soc. Nat. Hist., 1863, p. 111.—Zittel, Handb. Pal., 1, 1880, p. 691.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th ser., 1883, p. 412.—Miller, N. A. Geol. Pal., 1889, p. 345.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 205; 13th Ann. Rep. New York State Geologist, 1895, p. 829.—Koken, Die Leitfossilien, Leipzig, 1896, p. 245.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 760.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 219.

Eatonia goodlandensis Kindle and Breger.

Eatonia goodlandensis Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 439, pl. 8, figs. 10-12.

Niagaran: Near Goodland, Indiana.

ECCOPTOCHILE? MEEKANUS Slocum. See *Ceraurinus icarus*.

ECCULIOMPHALUS of authors. See *Eccyliomphalus* Portlock.

ECCYLIOMPHALUS (part) of authors. See *Eccyliopterus* Remele.

ECCYLIOMPHALUS Portlock.

Genotype: *E. bucklandi* Portlock.

Eccyliomphalus Portlock, Geol. Rep. Londonderry, 1843, p. 411.

Eccyliomphalus McCoy, British Pal. Rocks and Foss., 1854, p. 301.—Remele, Zeits. d. d. geol. Gesell., 40, 1888, p. 666.—Koken, Neues Jahrb. f. Min., Geol.,

ECYLIOMPHALUS—Continued.

Pal., 6, Beilage-Band, 1889, p. 317.—Miller, N. A. Geol. Pal., 1889, p. 402.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pp. 1024, 1029, 1036.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 276.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 662.

Orthostoma Conrad, 2d Ann. Rep. New York Geol. Surv., 1838, p. 119.—Miller, N. A. Geol. Pal., 1889, p. 414 (Genotype: *O. commune* Conrad).

Calaurops Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 314.—Miller, N. A. Geol. Pal., 1889, p. 399.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 662 (Genotype: *C. lituiformis* Whitfield).

***Eccyliomphalus atlanticus* (Billings).**

Eccyliomphalus Atlanticus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 250.

Canadian (Quebec—F., G.): Bay of St. John and Keppel Island, Newfoundland.

***Eccyliomphalus calciferus* (Whitfield).**

Euomphalus calciferus Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 47, pl. 8, figs. 12, 13.

Canadian (Beekmantown): Beekmantown, New York.

***Eccyliomphalus (Orthostoma) canadensis* (Billings).**

Eccyliomphalus Canadensis Billings, Canadian Nat. Geol., 6, 1861, p. 320, fig. 4; Geol. Canada, Geol. Surv. Canada, 1863, p. 232, fig. 243.

Calaurops Canadensis Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 315 (gen. ref.).

Canadian (Beekmantown): Ormstown, Phillipsburg, and Point Levis, Quebec.

***Eccyliomphalus circinatus* (Whiteaves).**

Eccyliomphalus circinatus Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 35, pl. 5, figs. 4 a-b; pl. 8, fig. 5; *ibid.*, pt. 2, 1895, p. 86.

Niagaran (Guelph): Galt, Hespeler, Elora, and Durham, Ontario.

***Eccyliomphalus (Orthostoma) communis* (Conrad).**

Orthostoma communis Conrad, 2d Ann. Rep. New York Geol. Surv., 1838, p. 119.—Hall, 15th Rep. New York State Cab. Nat. Hist., 1861, pl. 11, fig. 16.—

Miller, N. A. Geol. Pal., 1889, p. 414, fig. 691.

Mohawkian (Trenton?): New York.

***Eccyliomphalus compressus* (Whitfield).**

Eccyliomphalus compressus Whitfield, Bull. Amer. Mus. Nat. Hist., 9, 1897, p. 180, pl. 4, fig. 13.—Seely, Vermont State Geol. Rep., 7, 1910, pl. 61, fig. 13.

Canadian (Beekmantown): Colchester, Vermont.

***Eccyliomphalus contiguus* Ulrich.**

Eccyliomphalus contiguus Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1037, pl. 75, figs. 48-52.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 185, pl. 12, figs. 13-15.

Stones River (Murfreesboro): Murfreesboro, Tennessee.

?Trenton: Jacksonburg, New Jersey.

Cotypes.—Cat. No. 45797, U.S.N.M.

***Eccyliomphalus distans* (Billings).**

Eccyliomphalus distans Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 249, fig. 235.

Eccyliomphalus distans Miller, N. A. Geol. Pal., 1889, p. 403, fig. 672.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 663, fig. 915.

Chazy (Quebec—P.): Cow Head, Newfoundland.

Eccyliomphalus fredericus Raymond.

Eccyliomphalus fredericus Raymond, Bull. Amer. Pal., 3, 1902, p. 305, pl. 18, fig. 4; Ann. Carnegie Mus., 4, 1908, p. 202, pl. 53, figs. 1-3.

Chazyan: Crown Point, Valcour, etc., New York (Crown Point); Mingan Islands, Canada (Mingan).

Eccyliomphalus gyroceras (Roemer).

Euomphalus gyroceras Roemer, Kreide von Texas, 1852, pl. 11, figs. 6a, b, p. 91.

Eccyliomphalus gyroceras Miller, N. A. Geol. Pal., 1889, p. 403 (gen. ref.).

Canadian (Beekmantown): San Saba Valley, Texas.

Eccyliomphalus intortus (Billings).

Eccyliomphalus intortus Billings, Canadian Nat. Geol., 6, 1861, p. 320, fig. 5; Geol. Canada, Geol. Surv. Canada, 1863, p. 232, fig. 249.

Canadian (Beekmantown): Edwardstown, Phillipsburg, and Point Levis, Quebec.

Eccyliomphalus kalmi (Raymond).

Eccyliopterus kalmi Raymond, Ann. Carnegie Mus., 3, 1906, p. 576.

Eccyliomphalus kalmi Raymond, Ann. Carnegie Mus., 4, 1908, p. 202, pl. 53, fig. 4.

Chazyan (Crown Point): Sloop Bay, Valcour Island, New York.

Eccyliomphalus (Orthostoma) lituiformis (Whitfield).

Calaurops lituiformis Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 315, pl. 26, figs. 1-4.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 662, fig. 914.—Seely, Vermont State Geol., Rep., 7, 1910, pl. 60, fig. 4.

Eccyliomphalus (Calaurops) lituiformis Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1023 (gen. ref.).

Canadian (Beekmantown): Fort Cassin, Vermont.

Eccyliomphalus multiseptarius (Cleland).

Eccyliomphalus multiseptarius Cleland, Bull. Amer. Pal., 3, 1900, p. 123 (251), pl. 15, figs. 1-4; Bull. Amer. Pal., 4, 1903, p. 17.

Canadian (Tribes Hill): Near Fort Hunter, New York.

Eccyliomphalus perkinsi (Whitfield).

Euomphalus Perkinsi Whitfield, Bull. Amer. Mus. Nat. Hist., 3, 1890, p. 30, pl. 1, figs. 10-14.—Seely, Vermont State Geol. Rep., 7, 1910, pl. 56, figs. 6, 7.

Eccyliomphalus perkinsi Miller, 1st App. N. A. Geol. Pal., 1892, p. 693 (gen. ref.).

Canadian (Beekmantown): Fort Cassin, Vermont.

Eccyliomphalus priscus (Whitfield).

Eccyliomphalus priscus Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 46, pl. 8, figs. 19, 20.

Canadian (Beekmantown): Near Beekmantown, New York.

Eccyliomphalus proclivis (Raymond).

Eccyliopterus proclivis Raymond, Ann. Carnegie Mus., 3, 1906, p. 576.

Eccyliomphalus proclivis Raymond, Ann. Carnegie Mus., 4, 1908, p. 203, pl. 53, fig. 5.

Chazyan (Crown Point): Crown Point, New York.

Eccyliomphalus spiralis (Billings).

Eccyliomphalus spiralis Billings, Canadian Nat. Geol., 6, 1861, p. 321.

Canadian (Beekmantown): Phillipsburg, Quebec.

Eccyliomphalus subellipticus Weller.

Eccyliomphalus subelliptica Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 219, pl. 4, fig. 6.

Canadian (Beekmantown): Columbia, New Jersey.

Eccyliomphalus subrotundus Ulrich and Scofield.

Eccyliomphalus subrotundus Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, p. 1037, pl. 75, figs. 17, 18.

Trenton (Prosser): Wykoff, *Minnesota*.

Holotype.—Cat. No. 45798, U.S.N.M.

Eccyliomphalus superbus (Billings).

Eccyliomphalus superbus Billings, *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 250. Chazyan (Quebec—P): Portland Creek, Newfoundland.

Eccyliomphalus trentonensis (Conrad).

Cyrtolites Trentonensis Conrad, *Jour. Acad. Nat. Sci., Philadelphia*, 8, 1842, p. 270, pl. 17, fig. 4.—Hall, *Pal. New York*, 1, 1847, p. 189, pl. 40A, figs. 3a-d, pl. 41, figs. 1a-c.—Emmons, *Amer. Geology*, 1, pt. 2, 1855, p. 167, pl. 5, fig. 22; fig. 38.—Lesley, *Geol. Surv. Pennsylvania*, *Rep. P* 4, 1889, p. 183, figs.

Eccyliomphalus (?) *trentonensis* Hall, 12th *Rep. New York State Cab. Nat. Hist.*, 1859, p. 68 (gen. ref.).

Eccyliomphalus trentonensis Weller, *Geol. Surv. New Jersey*, *Pal.*, 3, 1903, p. 184, pl. 12, figs. 20, 21.

Trenton: Carlisle, Pennsylvania; Middleville, etc., New York; New Jersey.

ECCYLIOMPHALUS TRIANGULUS Grabau and Shimer. See *Eccyliopterus triangulus*.**Eccyliomphalus undulatus** (Hall).

Eccyliomphalus undulatus Hall, *Rep. Geol. Surv. Wisconsin*, 1861, p. 37.—Whitfield, *Mem. Amer. Mus. Nat. Hist.*, 1, pt. 2, 1895, p. 63, pl. 8, figs. 1-3.

Eccyliomphalus undulatus Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, p. 1036, pl. 75, figs. 19-23.—Grabau and Shimer, *N. A. Index Fossila*, 1, 1909, p. 663, fig. 916.

Black River (Platteville): Minneapolis, Minnesota; Beloit, Wisconsin; La Salle, Illinois; Lebanon, Tennessee (Stones River).

Plesiotypes.—Cat. Nos. 46054, 47927, U.S.N.M.

ECCYLIOPTERUS Remele.

Genotype: *Eccyliomphalus alatus* Roemer.

Eccyliopterus Remele, *Zeitschr. deutsch. geol. Ges.*, Band, 40, 1888, p. 666.—Koken, *Neues Jahrb. f. Min., Geol. Pal.*, 6, Beilage-Band, 1889, p. 318; *Die Leitfossilien*, Leipzig, 1896, p. 102; *Bull. de l'Acad. Imp. Sci. St. Petersburg*, 7, 1897, p. 174.—Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, pp. 1029, 1031.—Grabau and Shimer, *N. A. Index Fossila*, 1, 1909, p. 658.

Eccyliopterus beloitensis Ulrich and Scofield.

Eccyliopterus beloitensis Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, p. 1032, pl. 62, fig. 70; pl. 74, figs. 1-4.—Grabau and Shimer, *N. A. Index Fossila*, 1, 1909, p. 658, fig. 906c-e.

Black River: Beloit, Wisconsin (Platteville); High Bridge, Kentucky (Lowville).

Holotypes.—Cat. No. 45799, U.S.N.M.

Eccyliopterus disjunctus (Billings).

Ophileta? *disjuncta* Billings, *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 344, fig. 331a, b.

Eccyliopterus disjuncta Koken, *Neues Jahrb. Min. Geol. Pal.*, 6, Beilage-Band, 1889, p. 320 (gen. ref.).

Canadian (Beekmantown): Leeds and Grenville Counties, Canada.

ECCYLIOPTERUS KALMI Raymond. See *Eccyliomphalus kalmi*.

Eccylopterus? michleranus (Hall).

Euomphalus michleranus Hall, Rep. U. S. Mexican Bound. Surv., Emory, 1857, pl. 20, fig. 4.

Canadian (Beekmantown): Near El Paso, Texas.

Holotype.—Cat. No. 9825, U.S.N.M.

Eccylopterus ottawaensis (Billings).

Ophileta Ottawaensis Billings, Canadian Nat. Geol., 5, 1860, p. 166, figs. 9, 10; Geol. Canada, Geol. Surv. Canada, 1863, p. 180, fig. 173a., b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 500, figs.

Eccylopterus ottawaensis Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 937 (gen. ref.).

Trenton: Ottawa, Ontario.

Eccylopterus owenanus (Meek and Worthen).

Ophileta Owenana Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 313, pl. 3, fig. 6a, b.

Eccylopterus owenanus Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1032, pl. 74, figs. 10-14.

Eccylopterus owenensis Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 658, fig. 906f, g.

Trenton: Galena, Illinois (Galena); Wykoff, etc., Minnesota (Prosser).

Plesiotypes.—Cat. No. 45800, 45801, U.S.N.M.

ECCYLOPTERUS PROCLIVIS Raymond. See *Eccyliomphalus proclivis*.

Eccylopterus spiralis Ruedemann.

Eccylopterus spiralis Ruedemann, Bull. New York State Mus., 49, 1901, p. 34, pl. 2, figs. 9, 10.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

Eccylopterus triangulus (Whitfield).

Eccyliomphalus triangulus Whitfield, Bull. Amer. Mus. Nat. Hist., 3, 1890, p. 29, pl. 1, figs. 5-9.—Sardeson, Jour. Geol., 11, 1903, p. 481, fig. 18.

Eccyliomphalus triangulus Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 663, fig. 917.

Eccylopterus triangulus Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pl. 74, figs. 5, 6; pl. 62, fig. 73.

Canadian (Beekmantown): Providence Island, Lake Champlain, Vermont.

Plesiotypes.—Cat. No. 45802, U.S.N.M.

Eccylopterus vagrans (Raymond).

Helicotoma vagrans Raymond, Amer. Jour. Sci., 4th ser., 20, 1905, p. 376.

Eccylopterus vagrans Raymond, Ann. Carnegie Mus., 4, 1908, p. 204, pl. 49, figs. 10-11.

Chazyan (Crown Point): Valcour Island, New York.

Eccylopterus volutatus (Whitfield).

Eccyliomphalus volutatus Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 314, pl. 25, figs. 8-11.—Seely, Vermont State Geol., Rep. 7, 1910, pl. 59, figs. 8-10.

Eccylopterus volutatus Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pl. 62, figs. 71, 72; pl. 74, figs. 7-9.

Canadian (Beekmantown): Fort Cassin, Vermont.

Plesiotypes.—Cat. No. 45803, U.S.N.M.

ECHINOCRINUS FENESTRATUS Yandell. See *Tetracystis fenestratus*.

ECHINOCYSTIS Hall. See *Lysocystites* Miller.

ECHINOCYSTITES Hall. See *Lysocystites* Miller.

ECHINOENCRINITES ANATIFORMIS Hall. See *Chirocrinus anatiformis*.

ECHINOENCRINITES FENESTRATUS Troost. See *Tetracystis fenestratus*.

ECHINOGNATHUS Walcott. Genotype: *Eurypterus? clevelandi* Walcott.
Echinognathus Walcott, Amer. Jour. Sci., 3d ser., 23, 1882, p. 213.—Zittel, Handb. Pal., 2, 1885, p. 651.—Miller, N. A. Geol. Pal., 1889, p. 546.—Vogdes, Annals New York Acad. Sci., 5, 1889, p. 18.—Clarke, Zittel-Eastman Textb. Pal., 1, 1900, p. 676; 2d ed., 1913, p. 783.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 321.
Echinorhynchus (in error for *Echinognathus*) Martin, Trans. New York Acad. Sci., 2, 1882, p. 8.

Echinognathus clevelandi (Walcott).

Eurypterus? clevelandi Walcott, Amer. Jour. Sci., 3d ser., 23, 1882, p. 153, figs. 1, 2.

Eurypterus (*Echinognathus*) *clevelandi* Laurie, Trans. Royal Soc. Edinburgh, 39, 1899, p. 587.

Echinognathus clevelandi Walcott, Amer. Jour. Sci., 3d ser., 23, 1882, p. 213, figs. 1, 2.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 322, pl. 58, figs. 1, 2.

Utica: Holland Patent, Oneida County, New York.

Cotypes.—Cat. No. 26785, U.S.N.M.

ECHINORHYNCHUS Martin. See *Echinognathus* Walcott.

ECHINOSPHERA Angelin. See *Echinosphærites* Eichwald.

ECHINOSPHERITES Wahlenberg. Genotype: *Echinus aurantium* Gyllenhal.
Echinosphærites Wahlenberg, Acta Soc. Sci. Upsala, 8, 1821, p. 52.—Eichwald, Zool. Specialis, pt. 1, Vilnae, 1829, p. 231.—Müller, Ann. Mag. Nat. Hist., 2d ser., 13, 1854, p. 248.—Chapman, Canadian Jour., new ser., 2, 1857, p. 303.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 302.—Hall, Pal. New York, 3, for 1859, 1861, p. 150.—Zittel, Handb. Pal., 1, 1879, p. 417.—Barrande and Waagen, Syst. Sil. Centre Bohème, 7, pt. 1, 1887, p. 150, pls. 16, 21–25, 39.—Jaekel, Stammes. Pelmat., 1, Thecoidea u. Cyst., Berlin, 1899, p. 331.—Zittel-Eastman Textb. Pal., 1, 1900, p. 183.

Echinosphæra Angelin, Icon. Crinod., 1878, p. 28.—Haeckel, Amph. Cyst. Leipzig, 1896, p. 66, pl. 1, figs. 3–3E.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 53, figs. 14, 15.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 152.

Echinosphærites aurantium (Gyllenhal).

Echinus aurantium Gyllenhal, Kong. Vet. Akad. Hand., 33, 1772, p. 245, pl. 8, figs. 4, 5; pl. 9, figs. 6–9.—Wahlenberg, Jour. de Physique, 91, 1820, p. 188.

Echinosphærites aurantium Wahlenberg, Acta Soc. Sci. Upsala, 8, 1821, p. 52.—Bassler, Bull. Virginia Geol. Surv., 2a, 1909, pl. 3, fig. 19; pl. 21, figs. 6–8.

Sphæronites aurantium Hisinger, Anteckningar, 4, 1828, pp. 195, 198.

Echinosphæra aurantium Angelin, Iconog. Crin. Soc., 1878, p. 28, pl. 14, figs. 1–21.

Crystallocystis aurantium Haeckel, Die Amph. und Cyst., 1896, p. 66, pl. 1, figs. 3–3e.

Middle Ordovician: Esthonia, Russia; Pennsylvania, Maryland, and Virginia (Chambersburg); Virginia and Tennessee (Ottosee); Tennessee (Carters); Missouri, etc. (Kimmiswick).

Pteriotypes.—Cat. No. 56631, U.S.N.M.

ECHINUS AURANTIUM Wahlenberg. See *Echinosphærites aurantium*.

ECHINUS GYRACANTHUS Eaton. See *Tentaculites gyracanthus*.

ECTENOCRINUS Miller.

Genotype: *Heterocrinus simplex* Hall.

Ectenocrinus Miller, N. A. Geol. Pal., 1889, p. 242.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 324, pl. 14, fig. 7; pl. 15, fig. 7.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1890, pp. 380, 383, 385.—Bather, Kongl. Sv. Vet. Akad. Handl., 25, No. 2, 1893, p. 20; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 146, fig. 58, 3.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 152.—Zittel, Grundzuge Pal., 1, 1910, p. 151.—Springer, Mem. Geol. Surv. Canada, 15 P, 1911, p. 27; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 212.

Ectenocrinus canadensis (Billings).

Heterocrinus Canadensis Billings, Geol. Surv. Canada, Rep. Progr. for 1853–56, 1857, p. 273; Geol. Surv. Canada, dec. 4, 1859, p. 48, pl. 4, figs. 5a–5d.

Ectenocrinus canadensis Miller, N. A. Geol. Pal., 1889, p. 242 (gen. ref.).—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 22, pl. 4, fig. 10.

Heterocrinites simplex Troost, Amer. Assoc. Adv. Sci., 1850, p. 60 (nom. nud.). Trenton: Ottawa and Montreal, Canada; Frankfort, Kentucky.

Plesiotype.—Cat. No. 39921, U.S.N.M. (Troost's type of *H. simplex*.)

Ectenocrinus grandis (Meek).

Heterocrinus simplex var. *grandis* Meek, Geol. Surv. Ohio, Pal., 1843, p. 9, pl. 1, figs. 7a–c; Cincinnati Quart. Jour. Sci., 1, Jan., 1874, p. 13.

Ectenocrinus grandis Miller, N. A. Geol. Pal., 1889, p. 242, fig. 295.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 124, pl. 1, figs. 8a–d.

Heterocrinus simplex Hall (not Hall, 1847), 24th Rep. New York State Cab. Nat. Hist., 1872, pl. 5, fig. 11, 12.

Eden and Lower Maysville: Cincinnati, Ohio, and vicinity.

Trenton (Upper): Near Rogers Gap, Kentucky.

Ectenocrinus simplex (Hall).

Heterocrinus simplex Hall, Pal. New York, 1, 1847, p. 280, pl. 76, figs. 2a–d.—Billings, Geol. Surv. Canada, Rep. Prog., 1853–56, 1857, p. 271.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 7, pl. 1, figs. 4a, b, 5a, b.—Dyche, Science, 20, 1892, p. 66; Jour. Cincinnati Soc. Nat. Hist., 15, 1892, p. 101.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 502, fig. 1814.

Ectenocrinus simplex Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1880, p. 392, pl. 10, fig. 9.—Miller, N. A. Geol. Pal., 1889, p. 242, fig. 296.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 720, pl. 4, figs. 10, 10a.

Ectenocrinus (*Heterocrinus*) *simplex* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 42, 1890, p. 379.

Eden and Lower Maysville: Cincinnati, Ohio, and vicinity.

ECTOMARIA Koken.

Genotype: *Murchisonia niezkowskii* Schmidt.

Eunema (part) of Salter, Billings, Bigsby and Miller.

Murchisonia (part) of Whitfield and other authors.

Solenospira Ulrich, Geol. Minnesota, 3, pt. 2, 1897, pp. 959, 1021.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 635 (Genotype: *Eunema pagoda* Salter).

Ectomaria Koken, Bull. Acad. Imp. Sci. St. Petersburg, 5th ser., 7, No. 2, 1897, p. 201; Koken, Die Leitfossilien, 1896, p. 395; Neues Jahrb. für Min., Geol. und Pal., 1, 1898, p. 21.—Donald, Quart. Jour. Geol. Soc. London, 55, 1899, p. 252.

Ectomaria adelina (Billings).

Murchisonia Adelina Billings, Pal. Foss., 1, Geol. Surv. Canada, p. 232, fig. 217.

Solenospira adelina Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1021 (gen. ref.).

Ectomaria adelina Donald, Quart. Jour. Geol. Soc. London, 55, 1899, p. 253 (gen. ref.).

Canadian (Quebec-G): Cape Norman, Newfoundland.

Ectomaria? extenuata (Hall).

Murchisonia extenuata Hall, Pal. New York, 3, 1859, p. 298, pl. 54, figs. 15, 16.

Solenospira? extenuatum Grabau, Michigan Geol. Surv., Geol. Ser. 1, 1909, p. 176, pl. 16, fig. 7.

Cayugan (Manlius): Schoharie and Onondaga Counties, New York.

Upper Monroan (Lucas): Salt shaft, Detroit, Michigan.

Ectomaria minuta (Hall).

Murchisonia minuta Hall, Pal. New York, 3, 1859, p. 298, pl. 54, fig. 17.

Solenospira minuta Grabau, Michigan Geol. Surv., Geol. Ser. 1, 1909, p. 175, pl. 16, fig. 8.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 653.

Cayugan (Manlius): Fayetteville, New York.

Monroan: Monroe County (Raisin River) and Detroit, Michigan (Lucas).

Ectomaria missisquoi (Billings).

Murchisonia missisquoi Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 307.

Solenospira missisquoi Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1021 (gen. ref.).

Ectomaria missisquoi Donald, Quart. Jour. Geol. Soc. London, 55, 1899, p. 253 (gen. ref.).

Canadian (Beekmantown): Stanbridge, Quebec.

Ectomaria pagoda (Salter).

Eunema? pagoda Salter, Geol. Surv. Canada, Canadian Org. Rem., dec. 1, 1859, p. 30, pl. 6, fig. 5.

Murchisonia pagoda Chamberlin, Geol. Wisconsin, 1, 1883, p. 157, fig.

Solenospira pagoda Ulrich and Scofield, Geol. Minnesota 3, pt. 2, 1897, p. 1022, pl. 70, figs. 56-60.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 653, fig. 893d, e.

Ectomaria pagoda Donald, Quart. Jour. Geol. Soc. London, 55, 1899, p. 253.

Black River: Pauquettes Rapids, Ottawa River, Canada, and near Watertown, New York (Leray); Cannon Falls, Minnesota (Decorah); Beloit, Wisconsin (Platteville).

Plenotype.—Cat. No. 45997, U.S.N.M. (Ulrich and Scofield).

Ectomaria pagoda occidentalis (Whiteaves).

Solenospira pagoda var. occidentalis Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 193.

Ectomaria pagoda var. occidentalis Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1899, p. 244 (gen. ref.).

Black River or Richmond: Little Black Island, Lake Winnipeg.

Ectomaria prisca (Billings).

Eunema prisca Billings, Canadian Nat. and Geol., 4, 1859, p. 360, fig. 8, 1; Geol. Surv. Canada, 1863, p. 119, fig. 30.

Solenospira prisca Ulrich and Scofield, Geol. Minnesota, pt. 2, 1897, p. 1022, pl. 70, figs. 52-55.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 653, fig. 893c.

Ectomaria prisca Donald, Quart. Jour. Geol. Soc. London, 55, 1899, p. 253 (gen. ref.).

Ectomaria prisca—Continued.

Murchisonia (*Eunema*) *pagoda* Whitfield (not Salter), Geol. Wisconsin, 4, 1883, p. 218, pl. 5, fig. 20.

Chazy (Mingan): Mingan Islands, Canada.

Black River: Beloit and Janesville, Wisconsin; Minneapolis, Minnesota; Dixon, Illinois.

Pteriotype.—Cat. Nos. 46072, 46073, U.S.N.M. (Ulrich and Scofield).

Ectomaria prisca extenuata Ulrich.

Solenospira prisca var. *extenuata* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1022, pl. 70, figs. 52, 54.

Stones River (Murfreesboro): Murfreesboro, Tennessee.

Holotype.—Cat. No. 46074, U.S.N.M.

EDMONDIA Koninck.

Genotype: *Isocardia unioniformis* Phillips.

Edmondia Koninck, Desc. Animaux Fossiles, Liege, 1842-1844, p. 66.—King, Mon. Permian Foss. England, Pal. Soc., 1850, p. 162.—Pictet, Traite de Pal., 2d ed., 3, 1855, p. 501.—Zittel, Handb. Pal., 2, 1881, p. 127.—Hall, Pal. New York, 5, pt. 1, Lam., 2, 1885, p. XXXII.—Koninck, Ann. d. Mus. Royal d'Hist. Nat. de Belgique, 11, 1885, p. 28.—Miller, N. A. Geol. Pal., 1889, p. 478.—Hind, Mon. British Carb. Lam., 1, Pal. Soc., 1898, p. 255.

Edmondia? *arcuata* Cleland.

Edmondia (?) *arcuata* Cleland, Bull. Amer. Pal., 4, 1903, p. 18, pl. 4, figs. 5-7.

Canadian? (Beekmantown?): Three miles south Ingham Mills, New York.

Observation.—Probably a synonym for some species from the Stones River or higher formation.

Edmondia? *deckerensis* Weller.

Edmondia? *deckerensis* Weller, Geol. Surv. New Jersey, Rep. Pal., 3, 1903, p. 241, pl. 22, figs. 6-7.

Helderbergian (Decker Ferry): Two miles south of Tristates, New York.

Edmondia? *nilesi* Winchell and Marcy.

Edmondia *Nilesi* Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 97, pl. 2, fig. 13.

Modiolopsis nilesi Whitfield, Geol. Wisconsin, 4, 1882, p. 357 (gen. ref.).

Niagaran (Racine); Chicago, Illinois; Wisconsin.

EDMONDIA SUBANGULATA Hall. See *Cyrtodonta subangulata*.

EDMONDIA SUBTRUNCATA Hall. See *Whitella subtruncata*.

EDMONDIA VENTRICOSA Hall (part). See *Whitella ventricosa*.

Edmondia? *vetusta* Whiteaves.

Edmondia? *vetusta* Whiteaves, Geol. Surv. Canada, Pal., Foss., 3, p. 187, pl. 20, fig. 8.

Black River or Richmond: Inmost Island, Kinnow Bay, Lake Winnipeg.

EDRIOASTER Billings.

Genotype: *Cyclaster bigsbyi* Billings.

Cyclaster Billings (preoccupied), Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 292; Geol. Surv. Canada, Canadian Org. Rem., dec. 3, 1858, p. 82.—

Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 323.—Zittel, Grundzüge Pal., 1, 1910, p. 241.

EDRIOASTER—Continued.

Edrioaster Billings, Geol. Surv. Canada, dec. 3, 1858, p. 82.—Zittel, Handb. Pal., 1, 1879, p. 414.—Sturtz, Neues Jahrb. Min., Geol. Pal., 2, 1886, p. 144.—Miller, N. A. Geol. Pal., 1889, p. 242.—Jaekel, Stammes. d. Pemat., 1, Thecoidea u. Cyst., Berlin, 1899, p. 44.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 209, fig. 6.—Zittel, Grundzuge Pal., 1, 1910, p. 181.

Edriocystis Haeckel, Amph. und Cyst., Leipzig, 1896, p. 117.

Edrioaster bigsbyi (Billings).

Cyclaster Bigsbyi Billings, Geol. Surv. Canada, Rep. Progr. for 1853–1856, 1857, p. 293.

Agelacrinites (*Edrioaster*) *Bigsbyi* Chapman, Expos. Min. Geol., Canada, 1884, p. 110.—Sladen, Quart. Jour. Geol. Soc., 35, 1879, p. 750.

Agelacrinites *Bigsbyi* Schmidt, Mem. Acad. St. Petersburg, 22, No. 11, 1874, 34.

Edriocystis *Bigsbyi* Haeckel, Amph. u. Cyst., 1896, p. 118, pl. 3, figs. 35, 36.

Edrioaster *Bigsbyi* Billings, Geol. Surv. Canada (Can. Org. Rem.), dec. 3, 1858, p. 85, pl. 8, figs. 1, 1a, 2, 2a.—Jaekel, Stammes. d. Pemat., 1, Thecoidea u. Cyst., Berlin, 1899, p. 46, pl. 2, fig. 4.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 209, fig. 6.—Springer, Mem. Geol. Surv. Canada, 15 P, 1911, p. 44 (loc. occ.).

Trenton: Ottawa and Kirkfield, Ontario; High Bridge, Kentucky (Curdsville); Fillmore County, Minnesota (Prosser.).

Edrioaster saratogensis Ruedemann.

Edrioaster saratogensis Ruedemann, Bull. New York State Mus., 162, 1912, p. 86, pl. 3, figs. 2–4.

Trenton (Snake Hill): Snake Hill, Saratoga County, New York.

EDRIOCYSTIS Haeckel. See *Edrioaster* Billings.**EDRIOSPONGIA** Ulrich and Everett. Genotype: *E. basalis* Ulrich and Everett.

Edriospongia Ulrich and Everett in Miller, N. A. Geol. Pal., 1889, p. 159.—Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 271.

Edriospongia basalis Ulrich and Everett.

Edriospongia basalis Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 272, pl. 6, figs. 1a–c.

Black River (Platteville): Near Dixon, Illinois.

Sections of *holotype*.—Cat. No. 46556, U.S.N.M.

EICHWALDIA of authors. See *Dictyonella* Hall.**EICHWALDIA** Billings.

Genotype: *E. subtrigonalis* Billings.

Eichwaldia Billings, Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 190; Canadian Nat. Geol., 3, 1858, p. 442.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 81; Zittel-Eastman Textb. Pal., 1, 1900, p. 312; *ibid.*, 2d ed. 1913, p. 396.

Eichwaldia subtrigonalis Billings.

Eichwaldia subtrigonalis Billings, Geol. Surv. Canada; Rep. Progr. for 1857, 1858, p. 192, fig. 24; Canadian Nat. Geol., 3, 1858, p. 443, fig. 24; Geol. Canada, 1863, p. 142, fig. 76.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 310, figs. 241, 242; pl. 83, figs. 1–4.

Black River (Leray): Pauquette Rapids, Ottawa River, Canada.

ELKANIA Ford.Genotype: *Obolella desiderata* Billings.*Billingsia* Ford (not Dekoninck, 1876), Amer. Jour. Sci., 3d ser., 31, 1885, p. 466.*Elkania* Ford, Amer. Jour. Sci., 3d ser., 32, 1886, p. 325.—Miller, N. A. Geol.

Pal., 1889, p. 346.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 75,

165; 11th Ann. Rep. New York State Geologist, 1894, p. 241.—Walcott, Proc.

U. S. Nat. Mus., 28, 1905, p. 321.

Elkania ambigua* (Walcott).Obolella?* *ambigua* Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 67, pl. 1, fig. 2.*Billingsia?* *ambigua* Ford, Amer. Jour. Sci., 3d ser., 31, 1886, p. 467.*Elkania ambigua* Ford, Amer. Jour. Sci., 32, 1886, p. 325.—Hall and Clarke, Pal.

New York, 8, pt. 1, 1892, p. 78.—Walcott, Mon. U. S. Geol. Surv., 51, 1912,

p. 562, pl. 51, figs. 2, 2a-c.

Lower Pogonip: Northeast of Adams Hill and southeast of Jackson Mine, Eureka District, Eureka County, Nevada.

Holotype and *pleiotype*.—Cat. No. 24554, U.S.N.M.***Elkania desiderata* (Billings).***Obolella desiderata* Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1862, p. 69, fig.

62 on p. 68.—Davidson, Geol. Mag., 5, p. 309, figs. 1, 2.—Walcott, Bull. U. S.

Geol. Surv., 30, p. 111.

Billingsia desiderata Ford, Amer. Jour. Sci., 3d ser., 31, 1886, p. 466, figs. 1, 2.*Elkania desiderata* Ford, Amer. Jour. Sci., 32, 1886, p. 325.—Hall and Clarke,

Pal. New York, 8, pt. 1, 1892, p. 77, pl. 3, figs. 15-19; 11th Ann. Rep. State

Geol. New York, 1892, pl. 3, figs. 13-14.—Schuchert, Bull. U. S. Geol. Surv.,

87, 1897, p. 221.—Walcott, Mon. U. S. Geol. Surv., 51, 1912, p. 562, pl. 51,

figs. 1, 1a-d.

Canadian (Levis, *Didymograptus* zone): Point Levis, Quebec.***Elkania ida* (Billings).***Obolella ida* Billings, Pal. Fossils, Geol. Surv. Canada, 1, 1865, p. 71, fig. 63

(adv. sheets, 1862).—Walcott, Bull. U. S. Geol. Surv., 30, 1886, p. 111.—

Dawson, Canadian Rec.

Sci., 3, 1888, p. 55; Peter Redpath Mus., McGill Univ., 1888, p. 55.

Billingsia? *ida* Ford, Amer. Jour. Sci., 3d ser., 31, 1886, p. 467.*Elkania ida* Ford, Amer. Jour. Sci., 32, 1886, p. 325 (gen. ref.).—Walcott, Mon.

U. S. Geol. Surv., 51, 1912, p. 563, pl. 30, figs. 20, 20a; pl. 51, figs. 4, 4a-c.

Ozarkian? (Levis-erratics): Point Levis, Quebec.

ELKANIA PRETIOSA* Ford. See *Acrothete pretiosa*.**ELIPTOCEPHALA UNDULOSTRIATA* Miller. See *Proetus undulostriatus*.****ELPE Barrande.**Genotype: *E. inchoata* Barrande.*Elpe* Barrande, Syst. Sil. du Centre Boheme, 1, Suppl., 1872, p. 510.—Zittel,

Handb. Pal., 2, 1885, p. 554.—Ulrich, Zittel-Eastman Textb. Pal., 1, 1900,

p. 646.—Bassler, *ibid*, 2d ed., 1913, p. 741.*Leioditia* (Ulrich MS.) Jones, Geol. Surv. Canada, Cont. Micro-Pal., 3, 1891, p. 94.***Elpe cincinnatiensis* (Meek).***Cythere cincinnatiensis* Meek, Proc. Acad. Nat. Sci. Philadelphia, 1872, p. 331;Geol. Surv. Ohio, Pal., 1, 1873, p. 158, pl. 14, figs. 1a-d.—Miller, *Cincinnati*

Quart. Jour. Sci., 1, 1874, p. 120.—Jones, Ann. Mag. Nat. Hist., 5th ser., 14,

1884, p. 395, footnote.

Cytheropsis cincinnatiensis Miller, N. A. Geol. Pal., 1889, p. 541, fig. 993.*Maysville* (Corryville): Cincinnati, Ohio, and vicinity.

Elpe irregularis (Miller).

Cythere irregularis Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 108, pl. 1, figs. 7, 7a.

Cytheropsis irregularis Miller, N. A. Geol. Pal., 1889, p. 541 (gen. ref.).

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

Elpe radiata (Ulrich).

Leperditia radiata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 9, pl. 7, figs. 2-2b.

Eden (Fulton): First Ward, Cincinnati, Ohio.

Cotypes.—Cat. No. 41711, U.S.N.M.

Elpe ulrichi Foerste.

Elpe Ulrichi Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 532, pl. 37, figs. 14a-c.

Upper Medinan (Brassfield): Huffman's Quarry, near Dayton, Ohio.

EMMELEZOE Jones and Woodward.

Genotype: *Ceratiocaris elliptica* Jones.

Emmelezoe Jones and Woodward, Mon. British Pal. Phyllopoda, Pal. Soc., 1888,

pp. 3, 68.—Clarke, Zittel-Eastman Textb. Pal., 1, 1900, p. 657; 2d ed., 1913, p. 752.

Emmelezoe decora Clarke.

Emmelezoe decora Clarke, 54th Ann. Rep. New York State Mus., App. 1, 1902, p. 95, pl. 2, figs. 4-11; pl. 3, figs. 1-4.—Grabau and Shimer, N. A. Ind.

Fossils, 2, 1910, p. 379, fig. 1683.

Cayugan (Pittsford): Erie Canal, Monroe County, New York.

EMMONSIA Edwards and Haime. See *Favosites* Lamarck.**EMPEROCRINUS** Miller and Gurley.

Genotype: *E. indianensis* Miller and Gurley.

Emperocrinus Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 6, 1895,

p. 42.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 744.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 202.

Emperocrinus indianensis Miller and Gurley.

Emperocrinus indianensis Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 6, 1895, p. 43, pl. 4, figs. 16, 17.—Miller, N. A. Geol. Pal., 2d App., p. 744, figs. 1347, 1348.

Niagaran (Laurel): St. Paul, Indiana.

Enallopora D'Orbigny.

Genotype: *Gorgonia perantiqua* Hall.

Enallopora D'Orbigny, Prod. de Pal., 1, 1850, p. 22.—Emmons, Amer. Geology,

1, pt. 2, 1855, p. 206.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 169.—Miller, N. A. Geol. Pal., 1889, p. 300.

Observations.—For objections to the use of this name, see Geol. Surv. Illinois, 8, p. 683.

ENALLOPORA CINCTOSA Miller. See *Mitoclema cinctosum*.**ENALLOPORA PERANTIQUA** D'Orbigny. See *Protocrisina perantiqua*.**ENCRINASTER** Haeckel (part). See *Protaster* Forbes.**ENCRINURUS** Emmrich.

Genotype: *Trilobus punctatus* Brunn.

Cryptonymus Eichwald, (not Eichwald, 1825), Sil. Schichten Syst., Esthland, 1840.—Salter, Mon. British Tril., Pal. Soc., 1866, pp. 147, 168.—Angelin,

Pal. Scandinavica, 3d ed., Holmia, 1878, p. 2.

ENCINURUS—Continued.

- Encrinurus** Emmrich, *Zur. Natg. der Tril.*, 1844, p. 16; *Neues Jahrb. f. Min., etc.*, 1845, p. 42.—Hawle and Corda, *Abh. d. k. böhmischen Gesell. d. Wiss.*, 5 (ext.), 1847, p. 90, pl. 5, fig. 55.—Barrande, *Neues Jahrb. f. Min., etc.*, 1850, p. 778.—Salter, *Mem. Geol. Surv. United Kingdom*, dec. 3, 1853, pl. 4.—McCoy, *British Pal. Rocks Fossils*, 1854, p. 158.—Pictet, *Traité de Pal.*, 2d ed., 2, 1854, p. 523.—Nieszkowski, *Archiv. f. Naturk. Liv-, Ehst- u. Kurl.*, 1, 1857, p. 602.—Steinhardt, *Beit. z. Naturk. Preus. Phys.-Oekon. Gesell. Königsberg*, 1874, p. 57.—Schmidt, *Mem. l'Acad. Imp. Sci. St. Petersburg*, 7th ser., 30, 1881, p. 222.—Zittel, *Handb. Pal.*, 2, 1885, p. 621.—Novak, *Sitzb. d. k. böhm. Gesell. d. Wiss. Math. Naturw. Cl. for 1886*, p. 429.—Miller, *N. A. Geol. Pal.*, 1889, p. 547.—Koken, *Die Leitfossilien*, Leipzig, p. 36, 1896, fig. 24, figs. 5, 6.—Beecher, *Amer. Jour. Sci.*, 4th ser., 3, 1897, p. 105, pl. 3, fig. 25.—Jaekel, *Zeits. d. d. geol. Gesell.*, 53, 1901, p. 149.—Grabau, *Bull. New York State Mus.*, 45, 1901, p. 225; *Bull. Buffalo Soc. Nat. Sci.*, 7, 1901, p. 225.—Lindstrom, *Kongl. Sven. Vet. Akad. Handl.*, 34, No. 8, 1901, p. 26, 56.—Vogdes, *San Diego Soc. Nat. Hist.*, 1907, p. 61.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 314.—Slocum, *Field Mus. Nat. Hist., Geol. Ser.*, 4, 1913, p. 61.—Raymond, *Zittel-Eastman Textb. Pal.*, 1913, p. 723.
- Cromus** Barrande, *Syst. Sil. du Centre Boheme*, 1, 1852, p. 821, pl. 43.—Zittel, *Handb. Pal.*, 2, 1885, p. 621.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 36.—Jaekel, *Zeits. d. d. geol. Gesell.*, 53, 1901, p. 156.—Lindstrom, *Kongl. Sven. Vet. Akad. Handl.*, 34, No. 8, 1901, p. 11.—Pictet, *Traité de Pal.*, 2d ed., 2, 1854, p. 523.—Barrande, *Syst. Sil. du Centre Boheme*, Suppl., 1, 1872, p. 20.

Encrinurus americanus Vogdes.

- Encrinurus americanus** Vogdes, *Desc. New Crust. Clinton of Georgia*, 1886, p. 1.—Foerste, *Bull. Sci. Lab. Denison Univ.*, 2, 1887, p. 102.
Clinton: Taylors Ridge, west of Catoosa Station, Georgia.

Encrinurus cristatus Clarke.

- Encrinurus cristatus** Clarke, *Geol. Minnesota*, 3, pt. 2, 1894, p. 741, fig. 58.
Richmond (Maquoketa): Spring Valley, Minnesota.
Holotype.—Cat. No. 41953, U.S.N.M.

Encrinurus deltoideus Shumard.

- Encrinurus deltoideus** Shumard, 1st and 2d Ann. Rep. Geol. Surv. Missouri, pt. 2, 1855, p. 198, pl. B, fig. 10.—Foerste, *Bull. Sci. Lab. Denison Univ.*, 2, pt. 1, 1887, p. 102.—Keyes, *Missouri Geol. Surv.*, 4, 1894, p. 229.—Savage, *Bull. Geol. Surv., Illinois*, 23, 1913, p. 60, pl. 2, fig. 10.
Cryptonymus deltoideus Vogdes, *Mon. Genera Zethus, Cybele, Encrinurus and Cryptonymus*, 1878, p. 21.
Upper Medinan (Girardeau): Near Thebes, Illinois.

Encrinurus egani Miller.

- Encrinurus egani** Miller, *Jour. Cincinnati Soc. Nat. Hist.*, 2, 1880, p. 254, pl. 15, figs. 1, 1b; *N. A. Geol. Pal.*, 1889, p. 547, figs. 1004-5.—Weller, *Bull. Chicago Acad. Sci., Nat. Hist. Surv.*, 4, pt. 2, 1907, p. 257, pl. 24, figs. 8-11.
Niagaran (Racine): Joliet and near Lemont, Illinois.

Encrinurus elegantulus Billings.

- Encrinurus elegantulus** Billings, *Cat. Sil. Foss. Anticosti*, *Geol. Surv. Canada*, 1866, p. 62.—Foerste, *Bull. Sci. Lab. Denison Univ.*, 2, pt. 1, 1887, p. 102.
Anticostian (Jupiter River): The Jumpers, Anticosti.

ENCINURUS EXCEDRINUS Safford. See *Encrinurus raricostatus*.

Encrinurus indianensis Kindle and Breger.

Encrinurus indianensis Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1904, p. 482, pl. 24, figs. 14, 15.

Niagaran (Noblesville): Connors Mill, Huntington, Wabash, etc., Indiana.

Encrinurus laevis (Angelin).

Cryptonymus laevis Angelin, Pal. Scand., pt. 1, p. 4, pl. 4, fig. 10.

Encrinurus (*Cryptonymus*) *laevis* Salter, Sutherland's Jour. Voyage in Baffin Bay, etc., 2, App., 1852, p. 221, pl. 5, figs. 14, 14a.

Encrinurus laevis Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 502.

Cromus arcticus Houghton, Jour. Geol. Soc. Dublin, 1, 1857, p. 241, pl. 6, figs. 1-5. Niagaran: Griffiths Island, etc., Arctic America.

ENCINURUS MIRUS Billings. See *Cybeloides mirus*.

Encrinurus multisegmentatus (?Portlock) Billings.

Amphion multisegmentatus Portlock, Geol. Londonderry, 1843, p. 291, pl. 3, fig. 6.

Encrinurus multisegmentatus Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 61 (loc. ref.).—Salter, Mem. Geol. Surv. United Kingdom, decade 7, pl. 4.

Cryptonymus multisegmentatus Vogdes, Mon. Genera Zethus, etc., 1878, p. 29. Richmond (English Head and Ellis Bay): Junction Cliff, Anticosti.

Encrinurus nereus Hall.

Encrinurus sp. Hall, adv. sheets, 18th Rep. New York State Cab. Nat. Hist., 1865, p. 30; 20th Rep. New York State Cab. Nat. Hist., 1867, p. 334.

Encrinurus nereus Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 375, pl. 21, fig. 15; rev. ed., 1870, p. 425, pl. 21, fig. 15.—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 102.

Cryptonymus nereus Vogdes, Mon. Gen. Zethus, Cybele, etc., 1878, p. 24, pl. 3, fig. 17.

Niagaran (Racine): Racine, Wisconsin.

Encrinurus ornatus Hall and Whitfield.

Cybele punctata Hall (not Brönnich), Pal. New York, 2, 1852, p. 297, pl. 66A, figs. 1a-l.

Encrinurus punctatus Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 61 (loc. ref.).—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1897, p. 103; Proc. Boston Soc. Nat. Hist., 24, 1890, p. 269.—Van Ingen, School of Mines Quart., 1901, p. 66, pl. fig. 27.

Encrinurus cf. *punctatus* Norton, Proc. Iowa Acad. Sci., 3, 1896, p. 79.

Encrinurus ornatus Hall and Whitfield, Pal. Ohio, 2, 1875, p. 154, pl. 6, fig. 16.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 195, fig.—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 102.—Grabau, Bull. New York State Mus., 45, 1901, p. 225, fig. 157; Bull. Buffalo Soc. Nat. Hist., 7, p. 225, fig. 157.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 314, fig. 1627.

Cryptonymus ornatus Vogdes, Mon. Gen. Zethus, Cybele, etc., 1878, p. 23.

Niagaran (Clinton-Guelph): Eaton and Yellow Springs, Ohio; New York; Canada; Arkansas; Tennessee; Alabama.

Encrinurus pernodosus Slocum.

Encrinurus pernodosus Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, No. 3, 1913, p. 61, pl. 16, figs. 5-7.

Richmond (Maquoketa): Bloomfield, Clermont, and Elgin, Iowa.

ENCINURUS PUNCTATUS Foerste. See *Encrinurus thresheri* and *E. ornatus*.

Encrinurus raricostatus Walcott.

Encrinurus excedrinus Safford, Geol. Tennessee, 1869, p. 290 (nom. nud.).

Encrinurus raricostatus Walcott, 31st Rep. New York State Mus. Nat. Hist., 1880 (adv. sheets, 1877), p. 69.—Safford and Vogdes, Proc. Acad. Nat. Sci. Philadelphia, 1889, p. 167, text fig.—Clarke, Geol. Minnesota, 3, pt. 2, 1890, p. 740.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 128.

Cryptonymus raricostatus Vogdes, Mon. Genera Zethus, etc., 1878, p. 27.

Black River: Mineral Point, Beloit, and Janesville, Wisconsin (Platteville); Manitoba.

Encrinurus rarus (Walcott).

Ceraurus rarus Walcott, 31st Rep. New York State Mus. Nat. Hist., 1880 (adv. sheets, 1877), p. 68.

Ceraurus (*Cyrtometopus*) *rarus* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 738.

Encrinurus rarus Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 541, pl. 2, fig. 3.

Black River (Platteville): Beloit, Wisconsin.

Observation.—See *E. vannulus* Clarke.

Encrinurus thresheri Foerste.

Encrinurus thresheri Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 101, pl. 8, fig. 26.

Encrinurus punctatus Foerste, Geol. Surv. Ohio, 7, 1893, p. 531, pl. 27, fig. 26.

Upper Medinan (Brassfield): Dayton, Ohio; Hanover, Indiana.

Encrinurus trentonensis Walcott.

Encrinurus trentonensis Walcott, 31st Rep. New York State Mus. Nat. Hist., 1880 (adv. sheets, 1877), p. 68.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 202, pl. 15, figs. 26, 27.—Grabau and Shimer, N. A. Index Fossila, 2, 1910, p. 314.

Cryptonymus trentonensis Vogdes, Mon. Genera Zethus, etc., 1878, p. 28.

Black River: Clifton, Wisconsin; Dunleith, Illinois.

Trenton: Jacksonburg, New Jersey.

Encrinurus tuberculifrons Weller.

Encrinurus tuberculifrons Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 259, pl. 24, figs. 12-13.

Niagaran (Racine): Near Joliet, Illinois.

Encrinurus tuberculosus Collie.

Encrinurus tuberculosus Collie, Bull. Geol. Soc. Amer., 14, 1903, p. 418, pl. 59, fig. 3.

Trenton: Bellefonte, Pennsylvania.

Encrinurus vannulus Clarke.

Encrinurus vannulus Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 739, figs. 56, 57.

Black River (Platteville): Janesville and Beloit, Wisconsin.

Cotype.—Cat. No. 41954, U.S.N.M.

Observation.—Probably the same as *E. rarus* Walcott.

Encrinurus vigilans (Hall).

Ceraurus vigilans Hall, Pal. New York, 1, 1847, p. 245, pl. 65, figs. 2a-h.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 217, pl. 15, figs. 2a-c.

Cryptonymus vigilans Vogdes, Mon. Genera Zethus, etc., 1878, p. 29, pl. 2, figs. 2a-2h.

Encrinurus vigilans—Continued.

Encrinurus vigilans Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 952 (gen. ref.).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 216, figs.

Cybele vigilans Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 67 (gen. ref.).

Trenton: Middleville, etc., New York.

Encrinurus curvatus Eaton.

Encrinurus curvatus Eaton, Geol. Textb., 2d ed., 1832, p. 128, pl. 1, fig. 4.

Ordovician: Glens Falls, New York.

Observation.—Species based on a crinoid column.

ENCINURUS GIGANTEUS Eaton. See *Arthropycus alleghaniensis*.

ENCINURUS TRANSVERSUS Eaton. See *Phytopsis tubulosa*.

ENDOCERAS Hall.

Accepted genotype: *E. protaiforme* Hall.

Endoceras Hall, Amer. Jour. Sci. Arts, 47, 1844, p. 109; Pal. New York, 1, 1847, p. 58, p. 207 footnote.—Roemer, Neues Jahrb. f. Min., etc., 1848, p. 178.—Woodward, Man. Mollusca, pt. 1, 1851, p. 89, fig. 50 on p. 90.—Saemann, Palaeontographica, 3, 1852, pp. 147, 155, 157, 162.—Pictet, Traité de Pal., 2d ed., 2, 1854, p. 641.—Emmons, Amer. Geol., 1, pt. 2, 1855, pp. 143, 151.—Barrande, Bull. Soc. Geol. France, 2d, 12, 1855, p. 172; Neues Jahrb. f. Min., etc., 1855, p. 274, pl. 3, figs. 16, 71, p. 385.—Salter, Quart. Jour. Geol. Soc. London, 15, 1859, p. 376, fig. b.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 68.—Hitchcock, Geol. Vermont, 1, for 1861, 1862, p. 299.—Chapman, Canadian, Jour., n. s., 8, 1863, p. 21; Expos. Min. Geol. Canada, 1864, p. 129.—Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 773.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 130.—Barrande, Cephalopodes, Ext. Syst. Sil. du Centre Boheme, p. 103.—Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1881, pp. 20, 23, fig. 1; Geol. Wisconsin, 4, 1882, p. 228.—Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 85.—Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1883, p. 266.—Zittel, Handb. Pal., 2, 1884, p. 362.—Holm, Palaeont. Abhandl., Dames and Kayser, Bd. 3, Heft 2, 1885, pp. 4, 11.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 129.—Miller, N. A. Geol. Pal., 1889, p. 436.—Hyatt, Amer. Geol., 16, 1895, July, p. 1.—Koken, Die Leitfossilien, Leipzig, 1896, p. 48, fig. 30.—Holm, Geol. Foren Stockholm Forhandl., 18, 1896, p. 395; Sveriges Geol. Unders., ser. C, No. 163, 1896, p. 3.—Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 514; 2d ed., 1913, p. 595.—Ruedemann, Amer. Geol., 31, 1903, p. 214; Bull. New York State Mus., 90, 1906, pp. 404, 418.—Cuminga, 32d Ann Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 1026.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 41.

Diploceras Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1847, p. 267.—Whitfield, Geol. Wisconsin, 4, 1882, p. 228 (Genotype: *D. vanuxemi* Conrad).

Cyclendoceras Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 43.

Colpoceras Hall, 3d Rep. New York State Cab. Nat. Hist., rev. ed., 1850, p. 181; doc. ed., p. 174.—Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 783.—Miller, N. A. Geol. Pal., 1889, p. 432 (Genotype: *C. virgatum* Hall).

Observation.—The generic relations of the species here referred to *Endoceras* and also to *Cameroceras* are in many cases still to be investigated.

Endoceras angusticameratum Hall.

Endoceras angusticameratum Hall, Pal. New York, 1847, p. 218, pl. 51, fig. 3.

Trenton: Middleville, New York.

Endoceras annulatum Hall.

Endoceras annulatum Hall, Pal. New York, 1, 1847, p. 207, pl. 44, figs. 1a, b; Amer. Geol., 1, pt. 2, 1855, p. 152.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 243.

Endoceras annulatum var. *Whiteaves*, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 77, pl. 5, figs. 1, 1a; Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 202.

Cyclendoceras annulatum Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 43, fig. 1241.

Trenton: Watertown, New York; Lake Winnipeg, Canada.

ENDOCERAS APPROXIMATUM Hall. See *Cameroceras approximatum*.

Endoceras arctiventrum Hall.

Endoceras arctiventrum Hall, Pal. New York, 1, 1847, p. 217, pl. 51, figs. 2a, b. Trenton: Middleville, New York.

Endoceras arcuatum (J. F. James).

Colpoceras arcuatum James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 242, pl. 4, figs. 1a, b.

Maysville: Cincinnati, Ohio.

Observation.—Recognizable? Refers merely to siphuncle of some *Endoceras*.

Endoceras atlanticum (Barrande).

Orthoceras atlanticum Barrande, Syst. Sil. du Boheme, ser. 4, 2, 1870, pl. 430, figs. 12, 13.

Ordovician: Newfoundland.

ENDOCERAS AULEMA Miller. See *Nanno aulema*.

Endoceras bristolense Miller.

Endoceras bristolense Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 85, pl. 4, figs. 2, 2a.

Richmond (Maquoketa): Bristol, Illinois.

Endoceras(?) champlainense Ruedemann.

Endoceras(?) champlainense Ruedemann, Bull. New York State Mus., 90, 1906, p. 418, pl. 1, figs. 1-4, text fig. 5.

Canadian (Beekmantown): Near Beekmantown, New York.

Observation.—Compare *Endoceras consuetum* Sardeson.

Endoceras clarkel (Wetherby).

Colpoceras clarkel Wetherby, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 77, pl. 2, figs. 5, 5a.

Colpoceras clarkii Miller, N. A. Geol. Pal., 1889, p. 432, fig. 727.

Trenton (Curdsville): Mercer County, Kentucky.

Endoceras consuetum Sardeson.

Endoceras consuetum Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 103, pl. 6, fig. 11.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 42.

Canadian (Shakopee): Near Monroe and near Pickett Station, Wisconsin.

Observation.—Compare *Endoceras champlainense* Ruedemann.

ENDOCERAS CRASSISIPHONATUM Whiteaves. See *Narthecoceras crassisiphonatum*.

ENDOCERAS DISTANS Hall. See *Actinoceras distans*.

ENDOCERAS DUPLICATUM Hall. See *Cameroceras duplicatum*.

Endoceras egani Miller.

Endoceras egani Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 84, pl. 4, figs. 1, 1a, 1b.

Richmond (Maquoketa): Bristol, Illinois.

ENDOCERAS ELONGATUM Keyes. See *Endoceras proteiforme elongatum*.

Endoceras gemelliparum Hall.

Endoceras gemelliparum Hall, Pal. New York, 1, 1847, p. 60, pl. 19, figs. 1a, b.—Barrande, Neues Jahrb. f. Min., etc., 1855, p. 267; Bull. Soc. Geol. France, (2), 12, 1855, p. 166.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 152.

Black River: Hendersons Bay, Jefferson County, New York.

ENDOCERAS HENNEPINI Miller. See *Cameroceras hennepini*.

Endoceras(?) hudsoni Ruedemann.

Endoceras(?) hudsoni Ruedemann, Bull. New York State Mus., 90, 1906, p. 421, pl. 7, fig. 1, fig. 6.

Chazy (Valcour): Valcour Island, New York.

Endoceras hudsonicum Parks.

Endoceras hudsonicum Parks in Tyrrell, 22d Rep. Ontario Bur. Mines, 1913, p. 37. Niagaran (Guelph); Severn River, Ontario.

ENDOCERAS INÆQUABILE Miller. See *Cameroceras inæquabile*,

Endoceras insulare (Barrande).

Orthoceras insulare Barrande, Syst. Sil. du Bohème, 4th ser., 2, 1870, pl. 430, figs. 1-11; pl. 31, figs. 1-10.

Ordovician: Newfoundland.

ENDOCERAS LATIVENTRUM Hall. See *Cameroceras lativentrum*.

ENDOCERAS LONGISSIMUM Hall. See *Vaginoceras longissimum*.

Endoceras magister Ruedemann.

Endoceras magister Ruedemann, Bull. New York State Mus., 90, 1906, p. 423, pl. 8, fig. 1, fig. 7.

Chazy (Valcour): Valcour, New York.

Endoceras magniventrum Hall.

Endoceras magniventrum Hall, Pal. New York, 1, 1847, p. 218, pl. 53, figs. 1a-e; pl. 54, fig. 2b.—Barrande, Neues Jahrb. f. Min., etc., 1855, p. 267; Bull. Soc. Geol. France, 2d ser., 1855, p. 166.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 243.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 154.

Trenton: Middleville, New York.

ENDOCERAS MARCOUI Barrande. See *Cameroceras marcoui*.

Endoceras montrealense (Billings).

Orthoceras montrealensis Billings, Can. Nat. Geol., 4, 1859, pp. 361-363, figs. 11c-e; Geol. Canada, Geol. Surv. Canada, 1863, p. 121, figs. 37a-c.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 552, figs.—Whitfield, Bull. Amer. Mus. Nat. Hist., 3, 1890, p. 34.

Endoceras montrealense Hall, Pal. New York, 5, pt. 2, 1879, p. 221 (gen. ref.).—Ruedemann, Bull. New York State Mus., 90, 1906, p. 424, pl. 9, fig. 8, fig. 8.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 42, fig. 1238.

Orthoceras sordidum Whitfield, Bull. Amer. Mus. Nat. Hist., 3, p. 34, pl. 2, fig. 4. Canadian (Beekmantown): Near St. Eustache, Quebec; Fort Cassin, Vermont.

ENDOCERAS MULTITUBULATUM (Hall). See *Vaginoceras multitubulatum*.

Endoceras? ommaneyi Salter.

Orthoceras Ommaneyi Salter, App. to Sutherland's Jour. Voyage in Baffin Bay, etc., 1852, p. 222, pl. 5, figs. 16, 17; in Sutherland, Quart. Jour. Geol. Soc., 9, p. 314.—Haughton, Jour. Roy. Dublin Soc., 1, 1858, p. 249; in McClintock's "Discovery of the Fate of Franklin and his Companions" App. 4, 1859, p. 381. *Endoceras? ommaneyi* Foord, Cat. Foss. Ceph. British Mus., pt. 1, 1888, p. 155. Niagaran: Assistance Bay, Cornwallis Island, Arctic America.

Endoceras proteiforme Hall.

Endoceras proteiforme Hall, Pal. New York, 1, 1847, p. 208, pls. 46, figs. 1a-b, 2; 48, figs. 1, 4; 49, figs. 1a-e; 50, figs. 1-3; 52, 1a-b; 53, figs. 1a-c; 55, fig. 1, p. 311, 85, figs. 1a-f.—Gebhard, 9th Rep. New York State Cab. Nat. Hist. 1856, p. 45.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 151, pl. 16, figs. 1-3a, pl. 12, figs. 1-5; Man. Geol. 1860, p. 96, fig. 85.—Hitchcock, Geol. Vermont, 1, 1862, p. 299; *ibid.*, 2, pl. 12, fig. 1.—Chapman, Canadian Jour., n. s., 8, 1863, p. 21, fig. 131, p. 200, fig. 194; Expos. Min. Geol. Canada, 1864, p. 129, fig. 131, p. 172, fig. 194.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1876, p. 37, fig. 12c.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 130.—Emerson, Narrative Hall's Sec. Arctic Exped., U. S. Navy Dep., 1879, p. 579.—Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 86, pl. 12, figs. 1, 1a-c.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 153.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 243.—Hyatt, Zittel-Eastman, Texb. Pal., 1900, p. 515, fig. 1056.—Ruedemann Bull. New York State Mus., 90, 1906, p. 413, fig. 3.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1029, pl. 50, figs. 1-1d.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 42, fig. 1239, 1240.

Cameroceras proteiforme Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 777, pl. 48, figs. 1, 2; pl. 49, fig. 2; pl. 50, figs. 1, 2 (?); pl. 51, figs. 1-3; pl. 53, figs. 4-5.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 169.—Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 190, pl. 13, fig. 5.—Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 580.

Trenton: Middleville, Lowville, Watertown, etc., New York. The species has been identified from almost all the Mohawkian and Cincinnati formations of the United States and Canada.

Plesiotype.—Cat. No. 17401, U.S.N.M. (Walcott, 1884).

Observation.—The above references undoubtedly include a variety of forms.

Endoceras proteiforme elongatum Hall.

Endoceras proteiforme? var. elongatum Hall, Pal. New York, 1, 1847, p. 216, pl. 52, figs. 1a, b.

Endoceras elongatum Keyes, Missouri Geol. Surv., 5, 1894, p. 220.

Cameroceras proteiforme var. elongatum, Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 580 (gen. ref.)

Trenton: Middleville, New York.

ENDOCERAS PROTEIFORME VAR. LINEOLATUM Hall. See *Orthoceras lineolatum*.

Endoceras proteiforme strangulatum Hall.

Endoceras proteiforme var. strangulatum Hall, Pal. New York, 1, 1847, p. 212, pl. 46, figs. 4a-e.

Trenton: Middleville, New York.

ENDOCERAS PROTEIFORME VAR. TENUISTRIATUM Hall. See *Orthoceras tenuistriatum*.

ENDOCERAS PROTEIFORME VAR. TENUITEXTUM Hall. See *Orthoceras tenuitextum*.

Endoceras rapax Billings.

Orthoceras rapax Billings, Canadian Nat. Geol., 5, 1860, p. 176.

Endoceras rapax Miller, N. A. Geol. Pal., 1899, p. 437 (gen. ref.).

Black River: Kingston, Ontario.

Endoceras rottermundi (Barrande).

Orthoceras (*Endoceras*) *rottermundi* Barrande, Syst. Sil. du Boheme, 2d ser., 1866, pl. 220.

Endoceras rottermundi Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 749, pl. 220, figs. 9-11.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 151.

Black River: Island in Lake Huron (?Thessalon Island).

ENDOCERAS (*NARTHECOCERAS*) *SIMPSONI* Whiteaves. See *Narthecoceras simpsoni*.

Endoceras subannulatum (Whitfield).

Endoceras (*Cameroceras*) *subannulatum* Whitfield, Ann. Rep. for 1879, Wisconsin, Geol. Surv., 1880, p. 56; Geol. Wisconsin, 4, 1882, p. 230, pl. 7, figs. 15, 16.

Endoceras subannulatum Chamberlin, Geol. Wisconsin, 1, 1883, p. 159, fig.—Whiteaves, Trans. Royal Soc. Canada, 9, sec. 4, 1892, p. 78, pl. 5, figs. 2, 2a; Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 202.

Black River: Beloit, Wisconsin; Valley of Red River, western shore of Lake Winnipeg, East Selkirk, etc., Canada.

Endoceras subcentrale Hall.

Endoceras subcentrale Hall, Pal. New York, 1, 1847, p. 59, pl. 17, fig. 4.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 152.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 244.

Black River (Watertown): Watertown, New York.

Endoceras vanuxemi (Conrad).

Diploceras vanuxemi Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1848, p. 267, pl. 16, fig. 2.

Endoceras vanuxemi Miller, N. A. Geol. Pal., 1899, p. 437 (gen. ref.).

Trenton: Trenton Falls, New York.

Observation.—Clarke (Geol. Minnesota, 3, 1897) says *Diploceras* is unquestionably a *Cameroceras* and the type *D. vanuxemi* probably the same as *Endoceras proteiforme*.

Endoceras virgatum (Hall).

Colpoceras virgatum Hall, 3d Rep. New York State Cab. Nat. Hist., rev. ed., 1850, p. 182, pl. 5, fig. 2 (doc. ed., p. 174).

Endoceras virgatum Hall, Pal. New York, 5, pt. 2, 1879, p. 220 (gen. ref.).

Black River: Lewis County, New York.

ENDODESMA Ulrich.

Genotype: *E. cuneatum* Ulrich.

Endodesma Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 525.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 527.

Endodesma compressum Ulrich.

Endodesma compressum Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 529, pl. 36, figs. 35, 37.

Trenton (Prosser): Near Wykoff, Minnesota.

Holotype.—Cat. No. 46194, U.S.N.M.

Endodesma cuneatum Ulrich.

Endodesma cuneatum Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 526, pl. 36, figs. 33, 34.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 527, fig. 715d, e.
Trenton (Prosser): Near Wykoff, Minnesota.
Holotype.—Cat. No. 46195, U.S.N.M.

Endodesma gesneri (Billings).

Modiolopsis Gesneri Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 172, fig. 157a, b; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 43, figs. 45a, b (adv. sheets, 1862).—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 408, figs.
Endodesma gesneri Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 528, pl. 37, figs. 3, 4.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 527, fig. 715a.
Black River and Trenton: Ottawa, etc., Ontario.
Plesiotype.—Cat. No. 46196, U.S.N.M.

Endodesma orthonotum (Meek and Worthen).

Modiolopsis orthonota Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 295, pl. 1, fig. 7a.
Modiolopsis rectiformis Worthen, Bull. 1, Illinois State Mus. Nat. Hist., 1882, p. 38.
Endodesma orthonotum Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 527, pl. 37, figs. 1, 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 527, fig. 715b, c.
Black River (Platteville): Dunleith, Illinois.
Plastotype.—Cat. No. 46197, U.S.N.M.

Endodesma postlatum Ulrich.

Endodesma postlatum Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 527, pl. 37, figs. 5, 6.
Trenton (Galena): Dubuque, Iowa.

Endodesma traneeps (Raymond).

Cyrtodonta traneeps Raymond, Amer. Jour. Sci., 20, 1905, p. 372.
Chazyan (Crown Point): Valcour Island, New York.

Endodesma trentonense (Hall).

Modiolopsis? trentonensis Hall, Pal. New York, 1, 1847, p. 161, pl. 34, fig. 10.—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 412, fig.
Lyonsia trentonensis Emmons, Amer. Geology, 1, pt. 2, 1855, p. 170, pl. 14, fig. 4.
Endodesma trentonensis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 504 (gen. ref.).
Trenton: New York.

Endodesma undosum Ulrich.

Endodesma undosum Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 529, pl. 36, fig. 38.
Black River (Platteville): Near Beloit, Wisconsin.

ENDYMIONIA Vogdes. See *Endymionia* Billings.

ENDYMION Billings. See *Endymionia* Billings.

ENDYMIONIA Billings.

Genotype: *Endymion meeki* Billings.

Endymion Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, pp. 93, 94 (adv. sheets, 1862).

Endymionia Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 281.—Zittel, Handb. Pal., 2, 1885, p. 594.—Miller, N. A. Geol. Pal., 1889, p. 547.—Beecher, Amer. Jour. Sci., 3d ser., 49, 1895, p. 307; *ibid.*, 4th ser., 3, 1897, p. 187.

Endyminia Vogdes, Cal. Acad. Sci., Occ. Pap., 4, 1893, p. 253.

Endymionia meeki (Billings).

Endymion meeki Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 94, fig. 84 (adv. sheets, 1862).

Endymionia meeki Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 231.—Miller, N. A. Geol. Pal., 1889, p. 547, fig. 1006.

Canadian: Point Levis, Quebec (Levis, *Diplograptus dentatus* zone); Table Head, Pistolet Bay, etc., Newfoundland (Quebec-N, P).

ENOPLURA Wetherby. See *Ateleocystites* Billings.

ENOPLURA BALANOIDES Wetherby. See *Ateleocystites balanoides*.

ENOPLURA CRUSTACEA Bather. See *Ateleocystites balanoides*.

ENTEROLASMA Simpson.

Genotype: *Streptelasma strictum* Hall.

Enterolasma Simpson, Bull. New York State Mus., 39, 1900, p. 203.—Grabau, Bull. New York State Mus., 45, 1901, p. 136; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 136.

Enterolasma caliculum (Hall).

Streptelasma calicula Hall, Pal. New York, 2, 1852, p. 111, pl. 32, fig. 1a-k.—Lambe, Contr. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 113, pl. 7, figs. 4a-c.

Petraia calicula Billings, Geol. Surv. Canada, Geol. Canada, 1863, p. 308, fig. 310.—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 627, fig.

Cyathophyllum? *caliculum* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 601, pl. 34, fig. 8.

Enterolasma caliculus Grabau, Bull. New York State Mus., 45, 1901, p. 137, fig. 29; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 137, fig. 29.

Streptelasma (*Enterolasma*) *caliculum* Grabau and Shimer, N. A. Index Fossila, 1, 1906, p. 56, fig. 76g, 77.

Enterolasma cf. *caliculus* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 24, pl. 1, fig. 1.

Silurian (Cataract-Guelph): Rochester, Lockport, etc., New York; Grimsby, etc., Ontario; Lake Temiscaming, Quebec; Wisconsin, Ohio, Tennessee, Alabama, etc.

Enterolasma geometricum (Foerste).

Streptelasma calicula var. *geometricus* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 345, pl. 9, figs. 7, 12, 13.

Streptelasma? *geometricum* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 601, pl. 34, figs. 7, 12, 13.

Upper Medinan (Brassfield): Near Dayton and Todds Fork; near Wilmington, Ohio.

Enterolasma waynense (Safford).

Petraia Waynensis Safford, Geol. Tennessee, 1869, pp. 314, 320, pl. 5 (H), figs. 2a-h.—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, p. 628, figs.

Streptelasma waynense Miller, N. A. Geol. Pal., 1889, p. 205 (gen. ref.).

Enterolasma waynense Simpson, Bull. New York State Mus., 39, 1900, p. 204, figs. 13-15.

Enterolasma (*Petraia*) *waynense* Foerste, Jour. Geol., 11, 1903, p. 713 (loc. occ.). Niagaran (Brownsport): Wayne, Decatur, and Perry Counties, Tennessee.

ENTOMIS Jones.

Genotype: *E. tuberosa* Jones.

Entomis Jones, Mem. Geol. Surv. Great Britain, Expl. Map 32, Scotland, 1861, p. 137.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 707.—Ulrich, Zittel-

ENTOMIS—Continued.

Eastman Textb. Pal., 1, 1900, p. 646.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 1040.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 362.—Bassler, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 741.

Entomis madisonensis Ulrich.

Entomis madisonensis Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 107, pl. 7, figs. 12a–b.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 1046, pl. 53, figs. 8, 8b.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 362, fig. 1667, r, s.

Richmond (Whitewater-Saluda): Near Madison, Indiana.

Holotype.—Cat. No. 41565, U.S.N.M.

Entomis waldronensis Ulrich.

Entomis waldronensis Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 2, 1891, p. 183, pl. 12, figs. 3a, 3b.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 363, fig. 1668m, n.

Niagaran (Waldron): Waldron, Indiana.

Holotype.—Cat. No. 41566, U.S.N.M.

ENTOMOLITUS PARADOXUS PISIFORMIS Linnaeus. See *Agnostus pisiformis*.

ENTOMOSTRACITES PISIFORMIS Wahlenberg. See *Agnostus pisiformis*.

ENTOMOSTRACITES SCARABÆOIDES Wahlenberg. See *Peltura scarabæoides*.

ENTOMOSTRACITES SPINULOSUS Wahlenberg. See *Parabolina spinulosa*.

EOHARPES Raymond.

Genotype: *Harpes primus* Barrande.

Harpina Novak (not Burmeister, 1844) Sitz. d. k. böhm. Gesell. d. Wiss. Math.-Naturw. Cl. for 1884, 1885, p. 215.—Clarke, Geol. Minnesota, pt. 2, 1894, p. 756.—Beecher, Amer. Jour. Sci., 49, 1895, p. 307; *ibid.*, 3, 1897, p. 185.

Eoharpes Raymond, Amer. Jour. Sci., 19, 1905, p. 378; Zittel-Eastman Textb. Pal., 1913, p. 711.

Eoharpes antiquatus (Billings).

Harpes antiquatus Billings, Canadian Nat. Geol., 4, 1859, p. 469, fig. 38; Geol. Canada, Geol. Surv. Canada, 1863, p. 133, fig. 67.

Harpina antiquatus Raymond, Annals Carnegie Mus., 3, 1905, p. 330, pl. 10, fig. 1.

Eoharpes antiquatus Raymond, 7th Rep. Vermont State Geol., 1910, p. 214, pl. 32, fig. 1; Ann. Carnegie Mus., 7, No. 1, 1910, p. 60.

Chazy: Mingan Islands, Canada (Mingan); Valcour, Valcour Island and Chazy, New York; Isle La Motte, Vermont (Day Point, Crown Point).

Eoharpes cassinensis (Whitfield).

Harpes cassinensis Whitfield, Bull. Amer. Mus. Nat. Hist., 9, 1897, p. 182, pl. 5, figs. 3, 4.—Seely, Vermont State Geol., Rep. 7, 1910, pl. 55, figs. 3, 4.

Canadian (Beekmantown): Fort Cassin, Vermont.

Eoharpes consuetus (Billings).

Harpes consuetus Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 64.

Anticostian (Chicotte): Southwest Point, Anticosti.

Eoharpes dentoni (Billings).

Harpes Dentoni Billings, Canadian Nat. Geol., 8, 1863, p. 36, fig.; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 183, fig. 166.

Eoharpes dentoni Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 33, pl. 3, fig. 5.

Trenton (Curdsville): Ottawa, Ontario.

Eoharpes escanabiae (Hall).

Harpes escanabiae Hall, Geol. Lake Sup. Land Dist., Foster and Whitney's Rep., 1851, p. 211, pl. 27, fig. 2a.

Trenton: Escanaba River below Indian Creek, Michigan.

Eoharpes granti (Billings).

Harpes granti Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 326, fig. 314. Canadian (Beekmantown): Stanbridge, Quebec.

Eoharpes minnesotensis (Clarke).

Harpina minnesotensis Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 755, fig. 76.

Trenton (Prosser): Hader, Minnesota.

Holotype.—Cat. No. 41889, U.S.N.M.

Eoharpes ottawaensis (Billings).

Harpes ottawaensis Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 182, fig. 165; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 28.—Miller, N. A. Geol. Pal., 1889, p. 549, fig. 1011.

Harpina ottawaensis Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 757, fig. 79.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 191, pl. 14, figs. 1, 2.—Raymond, Annals Carnegie Mus., 3, 1905, p. 331, pl. 10, fig. 2.

Harpes (*Harpina*) *ottawaensis* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 258, fig. 1546.

Eoharpes ottawaensis Bassler, Bull. Virginia Geol. Surv., 29, 1909, p. 111, fig. 10.—Raymond, 7th Rep. Vermont State Geol., p. 215, pl. 32, fig. 2.—Ruedemann, Bull. New York State Mus., 162, p. 116, pl. 9, fig. 1.

Chazyan: Valcour, etc., New York (Day Point); Virginia (Liberty Hall.)

Trenton: Ottawa, Ontario; New Jersey, New York, Minnesota, etc.

Platotype.—Cat. No. 41887, U.S.N.M.

Eoharpes pustulosus (Hall).

Ceraurus? *pustulosus* Hall, Pal. New York, 1, 1847, p. 246, pl. 61, figs. 2a, b.

Harpes pustulosus Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 67 (gen. ref.).

Eoharpes pustulosus Raymond and Barton, Bull. Mus. Comp. Zool., 54, 1913, p. 542.

Black River: Watertown, New York.

Eoharpes rutrellum (Clarke).

Harpina rutrellum Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 757, figs. 80, 81.

Trenton (Prosser): Cannon Falls, and Minneapolis, Minnesota.

Holotype.—Cat. No. 41888, U.S.N.M.

EOORTHIS Walcott.

Genotype: *Orthis remnicha* Winchell.

Orthis (*Plectorthis*) Walcott (not Hall and Clarke), Proc. U. S. Nat. Mus., 28, 1905, pp. 257-259.

Plectorthis Grabau and Shimer (part) (not Hall and Clarke), N. A. Index Fossils, 1907, 1, p. 250.

Eoorthis Walcott, Smiths. Misc. Coll., 53, 1908, pp. 102-104; *ibid.*, 53, No. 4, 1908, pl. 11, and pp. 142 and 148; Mon. U. S. Geol. Surv., 51, 1912, p. 772.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 381.

Orthis (*Orusia*) Walcott, Proc. U. S. Nat. Mus., 28, 1905, p. 273.

Orusia Walcott, Smiths. Misc. Coll., 53, 1908, pl. 11, pp. 142, 148; U. S. Geol. Surv., Mon., 51, 1912, p. 765 (Genotype: *Anomites lenticularis* Wahlenberg).

Eoorthis atava (Matthew).

Strophomena atava Matthew, Trans. Roy. Soc. Canada, 1st ser., 1893, 10, sec. 4, pp. 102-103, pl. 7, fig. 8a-f.—Moberg and Segerberg, Medd. fran. Lunds Geol. Faltklubb, ser. B., No. 2, 1906.

Rafinesquina? *atava* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 338.

Orthis (Plectorthis) atava Walcott, Proc. U. S. Nat. Mus., 28, 1905, pp. 259-260.

Eoorthis atava Walcott, Mon. U. S. Geol. Surv., 51, pt. 1, 1912, p. 774, pl. 95, figs. 7, 7a-b.

Canadian (Bretonian—Div. C 3a): Navy Island, St. John Harbor, New Brunswick.

Eoorthis desmopleura (Meek).

Orthis coloradoensis Meek (not Shumard), Proc. American Phil. Soc., 2, 1870, p. 425.

Orthis desmopleura Meek, Hayden's U. S. Geol. Surv. Wyoming, 1872, p. 295.

Orthis (Plectorthis) desmopleura Walcott, Proc. U. S. Nat. Mus., 28, 1905, p. 261.

Eoorthis desmopleura Walcott, Mon. U. S. Geol. Surv., 1912, 51, p. 777, pl. 96, figs. 1, 1a-r.

Upper Cambrian: Utah, New Mexico, Pennsylvania, etc.

Lower Ordovician: Glen Eyre, Queens Canyon, near Manitou, and Colorado Springs, Colorado.

Holotype and *plesiotypes*.—Cat. Nos. 7859, 52317, 52320, U.S.N.M.

Eoorthis desmopleura nympha Walcott.

Orthis (Plectorthis) desmopleura nympha Walcott, Proc. U. S. Nat. Mus., 28, 1905, p. 262.

Eoorthis desmopleura nympha Walcott, Mon. U. S. Geol. Surv., 51, 1912, p. 778, pl. 96, fig. 2,

Lower Ordovician: Williams Canyon, Manitou, Colorado; also Upper Cambrian of Wyoming.

Holotype.—Cat. No. 52333, U.S.N.M.

Eoorthis johannensis (Matthew).

Orthisina(?) johannensis Matthew, Trans. Roy. Soc. Canada, 1st ser., 9, sec. 4, 1892, pp. 49-50, pl. 12, figs. 13a-c.

Clitambonites? *johannensis* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 184.

Orthis (Plectorthis) johannensis Walcott, Proc. U. S. Nat. Mus., 28, 1905, pp. 265, 266.

Eoorthis johannensis Walcott, Mon. U. S. Geol. Surv., 51, pt. 1, 1912, p. 781, pl. 97, figs. 10, 10a.

Canadian (Bretonian—Div. C 3a): Germaine Street, St. John, New Brunswick.

Eoorthis (Orusia) lenticularis (Wahlenberg).

Anomites lenticularis Wahlenberg, Nova Acta Regiae Soc. Sci. Upsal., 8, Petrif. tell. Svecanae, 1821, pp. 66, 67.

Orthis lenticularis Davidson, British Foss. Brachiopoda, 3, pt. 7, 1869, pp. 230-232, pl. 33, figs. 22-28 —Roemer, Leth. geog., pt. 1, Leth. Pal., Atlas, 1876, pl. 2, figs. 4a-c.—Matthew, Trans. Roy. Soc. Canada, 9, sec. 4, 1892, pp. 46-48, pl. 12, figs. 9a-d; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, pp. 213-116, pl. 17, figs. 1a-d.

Orthis (Orusia) lenticularis Walcott, Proc. U. S. Nat. Mus., 28, 1905, pp. 273-276.

Orusia lenticularis Walcott, Mon. U. S. Geol. Surv., 51, pt. 1, 1912, p. 98, figs. 1, 1a-p; 2, 2a-k; 3, 3a-b; 6, 6a-c. (See for complete bibliography.)

Orthis lenticularis strophomenoides Matthew, Trans. Roy. Soc. Canada, 9, sec. 4, 1892, p. 49, pl. 12, figs. 12-b; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 217, pl. 17, figs. 4a-b.

Boorthis (Orusia) lenticularis—Continued.

Olenus limestone and shale of Norway and Sweden; *Lingula flags* of North Wales etc.

Canadian (Bretonian—Div. C 3a-c): St. John, New Brunswick and Cape Breton, Nova Scotia.

Boorthis (Orusia) lenticularis atrypoides (Matthew).

Orthis lenticularis var. *atrypoides* Matthew, Trans. Royal Soc. Canada, 9, 1892, p. 48, pl. 12, figs. 11a, 11b; Geol. Surv. Canada, Rept. Cambrian Rocks Cape Breton, 1903, p. 217, pl. 17, figs. 3a-b.

Orthis (Orusia) lenticularis atrypoides Walcott, Proc. U. S. Nat. Mus., 28, 1905, p. 276.

Orusia lenticularis atrypoides Walcott, Mon. U. S. Geol. Surv., 51, pt. 1, 1912, p. 769, pl. 98, fig. 5.

Canadian (Bretonian—Div. C 3a): Germaine Street, St. John, New Brunswick.

Boorthis (Orusia) lenticularis lyncioides (Matthew).

Orthis lenticularis var. *lyncioides* Matthew, Trans. Royal Soc. Canada, 9, 1892, p. 49, pl. 12, figs. 10a-10c; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 216, pl. 17, figs. 2a-c.

Orthis (Orusia) lenticularis lyncioides Walcott, Proc. U. S. Nat. Mus., 28, 1905, p. 277.

Orusia lenticularis lyncioides Walcott, Mon. U. S. Geol. Surv., 51, pt. 1, 1912, p. 769, pl. 98, fig. 4.

Canadian (Bretonian—Div. C 3a): Germaine Street, St. John, New Brunswick.

Boorthis newtonensis (Weller).

Orthis newtonensis Weller, Geol. Surv. New Jersey, Pal., 3, 1903, pp. 113, 114, pl. 1, figs. 3-5.

Orthis (Plectorthis) newtonensis Walcott, Proc. U. S. Nat. Mus., 28, 1905, p. 267.

Boorthis newtonensis Walcott, Mon. U. S. Geol. Surv., 51, 1912, p. 784, pl. 97, figs. 9, 9a.

Upper Cambrian or Ozarkian (Kittatinny): Newton, Sussex County, New Jersey.

Boorthis wichitaensis Walcott.

Orthis (Plectorthis) wichitaensis Walcott, Proc. U. S. Nat. Mus., 28, 1905, pp. 271-272.

Boorthis wichitaensis Walcott, Mon. U. S. Geol. Surv. 51, 1912, p. 790, pl. 94, figs. 1a-o, u.

Lower Ordovician: Near Manitou, El Paso County, Colorado. Also Upper and Middle Cambrian of Oklahoma, Missouri, etc.

Holotype and *paratypes*.—Cat. Nos. 52381, 52384, U.S.N.M.

EOPHYTON (SCOLITHUS) DISPAR James. See *Scolithus dispar*.**EOPOLYCHÆTUS** Ruedemann.

Genotype: *E. albaniensis* Ruedemann.

Eopolychætus Ruedemann, Bull. New York State Mus., 42, 1901, p. 573.

Eopolychætus albaniensis Ruedemann.

Eopolychætus albaniensis Ruedemann, Bull. New York State Mus., 42, 1901, p. 573, pl. 1, fig. 13.

Trenton (Snake Hill): Rural Cemetery, near Albany, New York.

EOPTERIA Billings.

Genotype: *E. typica* Billings.

Eopteria Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 221.—Zittel, Handb.

Pal., 2, 1881, p. 36.—Miller, N. A. Geol. Pal., 1889, p. 480.

Eopteria? ornata Billings.

Eopteria ornata Billings, Pal. Foss. 1, Geol. Surv. Canada, 1865, p. 307, fig. 299, Ozarkian? (Levis-erratic): Point Levis, Quebec.

Eopteria richardsoni Billings.

Eopteria richardsoni Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 306, text fig. 298.—Miller, N. A. Geol. Pal., 1889, p. 480, fig. 821.
Canadian (Beekmantown): Near St. Antoine, above Quebec, Canada.

Eopteria typica Billings.

Eopteria typica Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 221.
Canadian (Quebec—G.): Port aux Choix, Newfoundland.

EOSPONGIA Billings.

Genotype: *E. roemeri* Billings.

Eospongia Billings, Geol. Vermont, 2, 1861, p. 955; Rep. Econ. Geol., etc., Vermont, 1862, p. 227.; Pal. Fossils, 1, Geol. Surv. Canada, 1865, pp. 18, 19 (adv. sheets, 1861).—Miller, N. A. Geol. Pal., 1889, p. 159.—Seely, Rep. State Geol. Vermont, 3, 1902, p. 153.

Eospongia roemeri Billings.

Eospongia roemeri Billings, Geol. Vermont, 2, 1862, p. 956; Rep. Econ. Geol., etc., Vermont, 1862, p. 228. Billings, Pal. Foss., 1, Geol., Surv. Canada, 1865, p. 19 (adv. sheets, 1861).
Chazyan (Mingan): Mingan Islands, Canada.

EOSPONGIA VARIANS Billings. See *Zittellella varians*.

EOTOMARIA Ulrich and Scofield.

Genotype: *E. canalifera* Ulrich.

Pleurotomaria and *Raphistoma* (part) of American authors.

Eotomaria, Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pp. 954, 1000.—Koken, Neues Jahrb. Min., Geol. and Pal., 1, 1898, p. 19.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 642.

Eotomaria areyi Clarke and Ruedemann.

Eotomaria areyi Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 68, pl. 8, fig. 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 643.—Grabau, Michigan Geol. Surv., Geol. Ser. 1, 1909, p. 187, pl. 23, fig. 5.
Niagaran (Guelph): Rochester, New York.
Upper Monroan (Lucas and Amherstburg): Detroit River region, Michigan.

Eotomaria canalifera Ulrich.

Eotomaria canalifera Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1002, pl. 69, figs. 9-14. (*E. sublaevis*, p. 954, in error.)
Pleurotomaria canalifera Miller, N. A. Geol. Pal., 1897, p. 769 (gen. ref.).
Stones River (Murfreesboro): Near Murfreesboro, Tennessee.
Cotypes.—Cat. No. 46055, U.S.N.M.

Eotomaria? cassina (Whitfield).

Lophospira cassina Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 312, pl. 25, figs. 1-4.—Seely, Vermont State Geol., Rep. 7, 1910, pl. 59, figs. 1-4.
Eotomaria? cassina Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 991 (gen. ref.).
Murchisonia cassina Miller, N. A. Geol. Pal., 1899, p. 411 (gen. ref.).
Canadian (Beekmantown): Fort Cassin, Vermont.

Eotomaria dryope (Billings).

Pleurotomaria Dryope Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 170, fig. 154a, b.

Eotomaria dryope—Continued.

Eotomaria dryope Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1003, pl. 69, figs. 21–25.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 642, fig. 875c-e.

Black River: Pauquettes Rapids, Ottawa River, Canada; Minneapolis and Cannon Falls, Minnesota (Platteville); Lincoln County, Missouri (Auburn); Maury County, Tennessee.

Plesiotype.—Cat. Nos. 45804, 45805, U.S.N.M.

Eotomaria durhamensis (Whiteaves).

Pleurotomaria Durhamensis Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 24, pl. 4, fig. 2; *ibid.*, pt. 2, 1895, p. 77.

Eotomaria durhamensis Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 68, pl. 10, fig. 17.

Niagaran (Guelph): Durham, Ontario; Rochester, New York.

Eotomaria elevata Ulrich.

Eotomaria elevata Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1005, pl. 70, figs. 68–69.

Scalites elevatus Miller, N. A. Geol. Pal., 2d App., 1897, p. 770 (gen. ref.).

Trenton (Catheys): Hartsville, Tennessee.

Holotype.—Cat. No. 45806, U.S.N.M.

Eotomaria galtensis (Billings).

Pleurotomaria Galtensis Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 343, fig. 349; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 154, fig. 136 (adv. sheets, 1862).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 709, fig.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 75, pl. 11, fig. 7.

Eotomaria galtensis Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 70, pl. 10, figs. 10–12.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 643, fig. 877.—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 123, pl. 25, fig. 1, 2.

Niagaran (Guelph): Galt, etc., Ontario; Oak Orchard Creek, New York; Wisconsin.

Upper Monroan (Lucas and Amherstburg): Detroit River region, Michigan.

EOTOMARIA HALEI Clarke and Ruedemann. See *Euomphalopterus halei*.**Eotomaria kayseri** Clarke and Ruedemann.

Eotomaria kayseri Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 70, pl. 7, fig. 1; pl. 8, fig. 1.

Niagaran (Guelph): Rochester, New York.

Eotomaria labiosa Ulrich.

Eotomaria labiosa Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1003, pl. 69, figs. 15–17.

Stones River (Murfreesboro): Murfreesboro, Tennessee.

Holotype.—Cat. No. 46056, U.S.N.M.

Eotomaria laphami (Whitfield).

Pleurotomaria Laphami Whitfield, Ann. Rep. for 1877, Wisconsin Geol. Surv., 1878, p. 84; Geol. Wisconsin, 4, 1882, p. 296, pl. 18, fig. 9.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 193, fig.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 455, pl. 11, fig. 4.

Pleurotomaria (*Eotomaria*) *laphami* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 70 (gen. ref.).

Eotomaria laphami—Continued.

Eotomaria laphami Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 70 (gen. ref.).

Niagaran: Ashford, Wisconsin (Racine); Delphi, Indiana.

Eotomaria obsoleta Raymond.

Eotomaria obsoletum Raymond, Amer. Jour. Sci., 4th ser., 20, 1905, p. 376; Ann. Carnegie Mus., 4, 1908, p. 192, pl. 49, figs. 12-14.

Chazyan (Day Point, Crown Point): Crown Point and Valcour Island, New York.

Eotomaria supracingulata (Billings).

Pleurotomaria supracingulata Billings, Rep. Progr., Geol. Surv. Canada, 1857, p. 302; Geol. Canada, Geol. Surv. Canada, 1863, p. 181, fig. 175.—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 717, fig.

Eotomaria supracingulata Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1894, p. 1004, pl. 69, figs. 26-29.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 643, fig. 876.

Raphistoma (*Pleurotomaria*) *nasoni* Hall, Rep. Geol. Surv. Wisconsin, 1862, p. 39, fig. 2.

Raphistoma Nasoni Whitfield, Geol. Wisconsin, 4, 1882, p. 215, pl. 6, figs. 2, 3.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 157, fig.—Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 78, pl. 11, figs. 21, 21a.

Pleurotomaria nasoni Hall, Rep. Supt. Geol. Surv. Wisconsin, 1861, p. 34.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 61, pl. 8, figs. 4-7.

Black River: St. Joseph's Island, Lake Huron; Dixon, etc., Illinois; Minneapolis, etc., Minnesota; Janesville and Beloit, Wisconsin; Eureka District, Nevada (Pogonip).

Plesiotypes.—Cat. Nos. 45807, 45808, U.S.N.M.

Eotomaria vicina Ulrich and Scofield.

Eotomaria vicina Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1003, pl. 69, figs. 18-20.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 643, fig. 875f.

Black River (Platteville): Minneapolis, Minnesota; Mineral Point, Wisconsin.

Cotype.—Cat. No. 45809, U.S.N.M.

EOTROPHONIA Ulrich.

Genotype: *E. setigera* Ulrich.

Eotrophonia Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 91.

Eotrophonia setigera Ulrich.

Eotrophonia setigera Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 91, pl. 4, fig. 5.

Eden (Economy): Covington, Kentucky.

Cotypes.—Cat. No. 46535, U.S.N.M.

EREMOCERAS Hyatt.

Genotype: *Cyrtoceras syphax* Billings.

Eremoceras Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 282; Zittel-Eastman Textb. Pal., 1900, p. 530; *ibid.*, 2d ed., 1913, p. 611.

Eremoceras syphax (Billings).

Cyrtoceras Syphax Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 194, text fig. 178.

Eremoceras syphax Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 282 (gen. ref.).

Canadian (Levis-limestone): Point Levis, Quebec.

ERIDONYCHIA Ulrich.

Genotype: *E. apicalis* Ulrich.

Eridonychia Ulrich, Geol. Surv. Ohio, 7, 1893, p. 639.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 980.

Eridonychia apicalis Ulrich.

Eridonychia apicalis Ulrich, Geol. Surv. Ohio, 7, 1893, p. 639, pl. 47, fig. 1.
Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

Holotype.—Cat. No. 46198, U.S.N.M.

Eridonychia crenata Ulrich.

Eridonychia crenata Ulrich, Geol. Surv. Ohio, 7, 1893, p. 640, pl. 47, fig. 3.

Richmond (Waynesville): Waynesville, Ohio.

Holotype.—Cat. No. 46199, U.S.N.M.

Eridonychia paucicostata Ulrich.

Eridonychia paucicostata Ulrich, Geol. Surv. Ohio, 7, 1893, p. 640, pl. 47, fig. 2.

Maysville (Fairmount): Covington, Kentucky.

Holotype.—Cat. No. 46200, U.S.N.M.

ERIDOPHYLLUM Edwards and Haime.

Genotype: *E. verneuianum* Edwards and Haime.

Eridophyllum Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), pp. 171-423.—Pictet, *Traité de Pal.*, 2d ed., 4, 1857, p. 459.—Billings, *Canadian Jour.*, n. s., 4, 1859, p. 130.—Milne Edwards, *Hist. Nat. Corall.*, 3, 1860, p. 414.—Dybowski, *Archiv. Naturf. Liv.*, Ebst- und Kurl., 5, 1873, p. 337.—Nicholson, *Rep. Pal. Prov. Ontario*, pt. 1, 1874, p. 34.—Zittel, *Handb. Pal.*, 1, 1879, p. 233.—Roemer, *Leth. geog.*, pt. 1, *Leth. Pal.*, 1883, p. 356.—Miller, *N. A. Geol. Pal.*, 2d App., 1897, p. 728.—Clarke and Ruedemann, *Mem. New York State Mus.*, 5, 1903, pp. 25, 26.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1906, p. 71.

Eridophyllum divdium Davis.

Eridophyllum divdium Davis, *Kentucky Foss. Corals*, Geol. Surv. Kentucky, 1885, pl. 109, figs. 3-12.

Niagaran (Louisville): Louisville, Kentucky.

Cotype.—Cat. No. 52776, U.S.N.M.

Eridophyllum eruciforme Davis.

Eridophyllum eruciforme Davis, *Kentucky Foss. Corals*, Geol. Surv. Kentucky, pt. 2, 1885, pl. 107.

Niagaran (Louisville): Louisville, Kentucky.

ERIDOPHYLLUM HURONICUM Davis. See *Diphyphyllum huronicum*.**Eridophyllum louisvillense** Greene.

Eridophyllum louisvillense Greene, *Cont. Indiana Pal.*, 1, pt. 11, 1903, p. 98, pl. 31, fig. 1.

Niagaran (Louisville): Louisville, Kentucky.

Eridophyllum proliferum Foerste.

Eridophyllum proliferum Foerste, *Jour. Geol.*, 11, 1903, p. 713.

Niagaran (Brownsport): Near Brownsport Furnace, near Linden, and near Savannah, Tennessee.

Eridophyllum rugosum Edwards and Haime.

Eridophyllum? rugosum Edwards and Haime, *Pol. Foss. des Terr. Pal.*, 1851, p. 424, pl. 10, figs. 4-4b.—Roemer, *Leth. geog.*, pt. 1, *Leth. Pal.*, 1883, p. 357.—Hall, 12th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 255, pl. 3, fig. 6.—Davis, *Kentucky, Foss. Corals*, Geol. Surv. Kentucky, pt. 2, 1885, pl. 109, fig. 1; pl. 110.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1889, p. 223, figs.—Simpson, *Bull. New York State Mus.*, 8, 1900, p. 123, fig. 38.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1906, p. 72, fig. 111; 113 a.

Eridophyllum rugosum—Continued.

Diphyphyllum rugosum Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 122, pl. 45, fig. 2.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 2, 1901, p. 157.

Middle Silurian: Gotland; Louisville, Kentucky; Cabots Head, Georgian Bay, etc., Ontario (Niagaran).

Eridophyllum sentum Davis.

Eridophyllum sentum Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 51, fig. 4; pl. 108, fig. 1.

Niagaran (Louisville): Louisville, Kentucky.

ERIDOPHYLLUM VENNORI Billings. See *Synaptophyllum multicaule*.

ERIDORTHIS Foerste. See *Hebertella* subgenus *Eridorthis*.

ERIDOTRYPA Ulrich.

Genotype: *E. mutabilis* Ulrich.

Batostomella (in part) Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 375, 432.

Eridotrypa Ulrich, Geol. Minnesota, 3, 1893, p. 264.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 756.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, p. 32.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 29.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, p. 745.—Hennig, Archiv. für Zool., 4, 21, p. 36.—Grabau and Shimer, N. A. Index Fossils, 1, 1908, p. 134.—Bassler, Bull. U. S. Nat. Mus., 77, p. 242.

Eridotrypa ædilis (Eichwald).

Cladopora ædilis Eichwald, Bull. Soc. Nat. Moscou, No. 4, 1855, p. 457; Leth. Rossica, 1, 1860, p. 404, pl. 24, figs. 12, 13.

Monticulipora ædilis Dybowski, Die Chætetiden Ostbaltischen Silur-Formation, 1877, p. 98, pl. 3, figs. 5, 5a.

Eridotrypa ædilis Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 242, 244, pl. 4, figs. 5, 5a; figs. 137, 138.

Eridotrypa mutabilis Ulrich, Geol. Minnesota, 3, 1893, p. 265, pl. 26, figs. 20–32.—Sardeson, Jour. Geol., 9, 1901, p. 13, pl. A, fig. 11.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 134, fig. 188f, 190f.

Middle Ordovician: Various localities in Esthonia, Russia; Goodhue, Ramsey, and Dakota Counties, Minnesota; Wisconsin, Tennessee, Kentucky, Ontario, etc. (Black River and Trenton).

Plesiotypes.—Cat. No. 43536, U.S.N.M. *Cotypes* of *E. mutabilis*.

Eridotrypa ædilis minor (Ulrich).

Eridotrypa mutabilis var. minor Ulrich, Geol. Minnesota, 3, 1893, p. 266, pl. 26, figs. 20, 21, 29, 30.

Eridotrypa ædilis minor Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 245, fig. 139.

Middle Ordovician: Cannon Falls, etc., Minnesota (Trenton-Prosser); Wesenberg, Esthonia, Russia (Wesenberg).

Cotypes.—Cat. No. 43537, U.S.N.M.

Eridotrypa briareus (Nicholson).

Chætetes briareus Nicholson, Pal. Ohio, 2, 1875, p. 202, pl. 21, 13–13b.

Monticulipora (Monotrypa) briareus Nicholson, Genus Monticulipora, 1881, p. 198, pl. 2, figs. 5–5c.

Monticulipora briarea James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 172.—J. F. James, *ibid.*, 16, 1894, p. 191.

Monticulipora (Chætetes) briareus Chamberlin, Geol. Wisconsin, 1, 1883, p. 172, fig.

Eridotrypa briareus—Continued.

Monotrypella briarea Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, pp. 24, 256 (gen. ref.).

Eridotrypa briareus Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1906, p. 237.—Nickles, Bull. Kentucky Geol. Surv. No. 5, 1905, p. 43, pl. 1, figs. 4, 5.

Trenton: Covington, Kentucky. An abundant species in central Kentucky (Cynthiana) and central Tennessee (Bigby, Cathey).

Eridotrypa echinata (Hall).

Trematopora echinata Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1874, pl. 11, figs. 1-5; *ibid.*, Mus. ed., 1879, p. 112, pl. 11, figs. 1-5; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 233, pl. 10, figs. 1-5.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, p. 1200, figs.

Eridotrypa echinata Ulrich, Geol. Minnesota, 3, 1893, p. 265.

Niagaran (Waldron): Waldron, Indiana.

Eridotrypa exigua Ulrich.

Eridotrypa exigua Ulrich, Geol. Minnesota, 3, 1893, p. 266, pl. 26, figs. 17-19.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 245, 246, fig. 140.

Trenton: Cannon Falls, Minnesota (Prosser); Trenton Falls, New York; Chimney Point, Vermont.

Middle Ordovician (Jewe): Near Jewe, Esthonia, Russia.

Cotypes.—Cat. No. 43535, U.S.N.M.

ERIDOTRYPA MUTABILIS Ulrich. See *Eridotrypa sedilis*.

ERIDOTRYPA MUTABILIS var. *MINOR* Ulrich. See *Eridotrypa sedilis minor*.

Eridotrypa nodulosa Bassler.

Eridotrypa nodulosa Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 30, pl. 11, figs. 14, 15; pl. 25, figs. 1-3.

Clinton (Rochester): Lockport and Rochester, New York.

Cotypes.—Cat. No. 35524, U.S.N.M.

Eridotrypa parvulipora Ulrich and Bassler.

Eridotrypa parvulipora Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 272, pl. 43, figs. 5-8; pl. 44, figs. 7, 8.

Helderbergian (Keyser): Keyser and Cherry Run, West Virginia; Cumberland, Maryland.

Cotypes.—Cat. No. 53643, U.S.N.M.

Eridotrypa similis Bassler.

Eridotrypa similis Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 31, 32, pl. 12, figs. 10-14; pl. 26, figs. 1, 2.—Grabau and Shimer, N. A. Index Fossil, 1, 1907, p. 134.

Clinton (Rochester): Lockport, etc., New York; Grimsby and Thorold, Ontario.

Cotypes.—Cat. No. 35519, U.S.N.M.

Eridotrypa simulatrix (Ulrich).

Batostomella simulatrix Ulrich, Geol. Surv. Illinois, 8, 1890, p. 432, pl. 35, figs. 1-1g.

Eridotrypa simulatrix Ulrich, Geol. Minnesota, 3, 1893, p. 265.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 828, pl. 16, figs. 4, 4b; pl. 29, figs. 5, 5a.

Monticulipora simulatrix J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 194.

Richmond: Clarksville, Waynesville, and other localities in Ohio; Weisberg and Versailles, Indiana; Savannah, Illinois; Anticosti.

Cotypes.—Cat. No. 43744, U.S.N.M.

Eridotrypa solida (Hall).

Trematopora solida Hall, Pal. New York, 2, 1852, p. 153, pl. 40a, figs. 6a-c.—
Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 258.

Homotrypa? solida Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900,
p. 293.

Eridotrypa solida Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 30, 31, pl. 12,
figs. 7-9; pl. 24, figs. 20-23; pl. 25, fig. 16.

Clinton (Rochester): Lockport, Rochester, etc., New York; Grimsby and Thor-
old, Ontario.

Plesiotypes.—Cat. No. 35525, U.S.N.M.

Eridotrypa spinosa Bassler.

Eridotrypa spinosa Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 29, 30, pl. 12,
figs. 1-3; pl. 25, fig. 15.

Clinton: Grimsby, Ontario; Lockport, Lewiston, and Rochester, New York
(Rochester); Osgood, Indiana (Osgood).

Cotypes.—Cat. Nos. 35521, 35739, U.S.N.M.

Eridotrypa striata (Hall).

Trematopora striata Hall, Pal. New York, 2, 1852, p. 153, pl. 40, fig. 7a-d.—
Grabau, Bull. New York State Mus., 45, 1901, p. 167, fig. 66.

Eridotrypa striata Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 32, pl. 12,
figs. 4-6; pl. 24, figs. 3-6; pl. 25, fig. 14.

Clinton: Lockport, Niagara Falls, and Rochester, New York; Grimsby, Ontario
(Rochester); Osgood, Indiana (Osgood).

Cotypes.—Cat. No. 35545, U.S.N.M.

Eridotrypa trentonensis (Nicholson).

Monticulipora (Heterotrypa) *Trentonensis* Nicholson, Genus *Monticulipora*, 1881,
p. 149, fig. 28.

Monotrypella Trentonensis Foord; Contr. Micro-Pal. Cambro-Sil., 1883, p. 15.—
Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 83.

Eridotrypa trentonensis Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1890,
p. 238.

Trenton: Peterboro, Ontario; Mercer County, Kentucky.

ERIDOTRYPA VEVAYENSIS Cumings. See *Batostoma jamesi*.

ERIPTYCHIUS Walcott.

Genotype: *E. americanus* Walcott.

Eriptychius Walcott, Bull. Geol. Soc. Amer., 3, 1892, p. 167.

Eriptychius americanus Walcott.

Eriptychius americanus Walcott, Bull. Geol. Soc. Amer., 3, 1892, p. 167, pl. 4,
figs. 5-11.

Black River (Harding): Canyon City, Colorado.

Erisocrinus? bipartitus (Troost).

Donacricrinites bipartitus Troost MS., 1850.

Erisocrinus? bipartitus (Troost) Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 98,
pl. 6, figs. 8, 9.

?Niagaran (Brownsport): Decatur County, Tennessee.

Observation.—Probably a *Graphiocrinus* from the Carboniferous of the Missis-
sippi Valley and not from Decatur County, Tennessee [Frank Springer.]

ESCHARA BIFURCATA Van Cleve. See *Pachydictya bifurcata*.

ESCHARA BIPUNCTATA Van Cleve. See *Phænopora expansa*.

84243°—Bull. 92—15—32

ESCHARA COMPRESSA Van Cleve. See *Phænopora magna*.

ESCHARA MULTIFIDA Van Cleve. See *Phænopora multifida*.

Eschara ovatopora Troost. Not recognizable.

Escharia ovatopora Troost, 5th Geol. Rep. Tennessee, 1840, p. 75.

Ordovician: Near Nashville, Tennessee.

ESCHARA RAMOSA Van Cleve. See *Phænopora fimbriata*.

Eschara reticulata Troost. Not recognizable.

Escharia reticulata Troost, 5th Geol. Rep. Tennessee, 1840, p. 75.

Ordovician: Near Nashville, Tennessee.

ESCHARINA DISTORTA James. See *Rhinopora verrucosa*.

ESCHAROPOREA Hall.

Genotype: *E. recta* Hall.

Escharopora Hall, Pal. New York, 1, 1847, p. 72.—Eichwald, *Lethæa Rossica*, 1, 1860, p. 435.—Miller, N. A. Geol. Pal., 1889, p. 301.—Ulrich, Geol. Minnesota, 3, 1893, p. 167; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 279.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 45.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 156.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 745.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 115; Zittel-Eastman Textb. Pal., 1913, p. 345.

Nicholsonia Waagen and Wentzel, Pal. Indica, 13th ser., 1886, p. 874.

Ptilodictya (in part) of various authors.

Escharopora acuminata (James).

Ptilodictya acuminata James, Catal. Foss. Cincinnati Group, p. 3.

Escharopora acuminata Ulrich, Geol. Minnesota, 3, 1893, p. 167.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 36.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 829.

Sagenella striata James, Paleontologist, No. 3, 1899, p. 22.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 53.

Eden: Cincinnati, Ohio, and vicinity.

Observation.—*Sagenella striata* was founded upon the expanded base of this species.

Escharopora angularis Ulrich.

Escharopora angularis Ulrich, Geol. Minnesota, 3, 1893, p. 168, pl. 12, figs. 1-4, 30, 31.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 344, fig. 504a.

Black River (Platteville and Decorah): Minneapolis, etc., Minnesota; High Bridge, Kentucky.

Cotypes.—Cat. No. 43538, U.S.N.M.

ESCHAROPOREA (PTILODICTYA) ANGUSTA Hall. See *Ptilodictya angusta*.

Escharopora briareus (Ulrich).

Ptilodictya briareus Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 165, pl. 7, figs. 6-6b.

Escharopora briareus Ulrich, Geol. Minnesota, 3, 1893, p. 167.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 239.

Stones River (Lebanon): Lebanon, Shelbyville, and Columbia, Tennessee.

Holotype.—Cat. No. 43728, U.S.N.M.

Observation.—The form called by Safford *Ptilodictya multiramis* (not defined) is probably referable to this species.

Escharopora confluens Ulrich.

Escharopora confluens Ulrich, Geol. Minnesota, 3, 1893, p. 171, pl. 13, figs. 1-11.

Black River (Decorah): Minneapolis, etc., Minnesota.

Cotypes.—Cat. No. 43539, U.S.N.M.

Escharopora falciformis (Nicholson).

- Ptilodictya cruciformis* D'Orbigny, Prodr. de Pal., 1, 1849, p. 21 (not defined).—
 Boule and Thevenin, Ann. de Pal., 1, fasc. 1, 1906, p. 4, pl. 1, figs. 7-9.
Ptilodictya falciformis Nicholson, Ann. Mag. Nat. Hist., 4th ser., 15, 1875, p. 177,
 pl. 14, figs. 1-1b; Pal. Ohio, 2, 1875, p. 259, pl. 25, figs. 7, 7b; Pal. Province
 Ontario, 1875, p. 13, fig. 2.—Zittel, Handb. Pal., 1, 1880, p. 604, fig. 431.—
 Hall, 12th Ann. Rep. Indiana Geol. Nat. Hist., 1883, p. 265, pl. 12, fig. 1.—
 Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 827, figs.
Escharopora falciformis Ulrich, Geol. Minnesota, 3, 1893, p. 167.—Grabau and
 Shimer, N. A. Index Fossils, 1, 1907, p. 156.—Cumings, 32d Ann. Rep. Dep.
 Geol. Nat. Res. Indiana, 1908, p. 830, pl. 16, figs. 5, 5a.
Escharopora recta Quenstedt, Roehren- und Sternkorallen, 1881, p. 94, pl. 146, pp.
 69, 70.
Crateripora lineata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 30, pl. 7,
 figs. 28, 28a.
Crateripora lineata var. *expansa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879,
 p. 30.
 Maysville: Cincinnati, Ohio, and vicinity (Mt. Hope, Fairmount); Nashville
 and Columbia, Tennessee (Leipers); Appalachians of Tennessee and Virginia.
Plesiotypes.—Cat. Nos. 43729, 43730, U.S.N.M. *Holotype* of *C. lineata* and var.
expansa.
 Observation.—*Crateripora lineata* and var. *expansa* were applied to the articu-
 lating basal sockets of this species before their true nature was known.

Escharopora hilli (James).

- Ptilodictya Hilli* James, Paleontologist, No. 1, 1878, p. 4.—Ulrich, Jour. Cincinnati
 Nat. Hist., 5, 1882, pl. 7, figs. 7, 7a.—Nettleroth, Kentucky Fossil Shells, 1885,
 p. 30, pl. 33, figs. 1, 2, 4, 5.—Ulrich, Geol. Minnesota, 3, 1893, p. 167.—Nickles,
 Bull. Kentucky Geol. Surv., No. 5, 1905, p. 53, pl. 3, figs. 2, 3.—Bassler,
 Proc. U. S. Nat. Mus., 30, 1906, p. 37.
 Maysville (Fairmount): Bank of the Ohio River at Cincinnati, Ohio (drift); Boyle
 and Lincoln Counties, Kentucky.
Plesiotypes.—Cat. Nos. 43724, 51377, U.S.N.M.

Escharopora libana (Safford).

- Ptilodictya? libana* Safford, Geol. Tennessee, 1869, p. 286.
Escharopora libana Ulrich, Geol. Minnesota, 3, 1893, p. 167.
 Stones River (Lebanon): Lebanon, Tennessee.
Cotypes.—Cat. No. 43477, U.S.N.M.

Escharopora? limitaris Ulrich.

- Escharopora? limitaris* Ulrich, Geol. Minnesota, 3, 1893, p. 172, figs. 9a-b, pl. 13,
 figs. 12, 13.
 Black River (Decorah): Minneapolis and Preston, Minnesota; Lake Nipissing,
 Ontario.
Cotypes.—Cat. No. 43807, U.S.N.M.

Escharopora maculata (Ulrich).

- Ptilodictya maculata* Ulrich Jour., Cincinnati Soc. Nat. Hist., 5, 1882, p. 163, pl.
 6, 17, pl. 7, figs. 4, 4a; Geol. Surv. Illinois, 8, 1890, fig. 6b (p. 317).
Escharopora maculata Ulrich, Geol. Minnesota, 3, 1893, p. 167.
 Maysville (Fairmount): Cincinnati, Ohio, and vicinity.
Cotypes.—Cat. No. 43726, U.S.N.M.

Escharopora pavonia (D'Orbigny).

Ptilodictya pavonia D'Orbigny, Prodr. de Pal., 1, 1849, p. 22.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 163, pl. 7, figs. 3, 3d.

Chætetes pavonia Milne-Edwards and Haime, Pol. Foss. Terr. Pal., 1851, p. 267, pl. 19, figs. 4, 4a.—Rominger, Proc. Acad. Nat. Sci. Philadelphia, 1866, p. 116.—Quenstedt, Röhren- und Sternkorallen, 1881, p. 79, pl. 146, figs. 21–25.

Monticulipora pavonia Milne-Edwards, Hist. Nat. des Corall., 3, 1860, p. 276.—James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 18.—James, *ibid.*, 18, 1895, p. 70.

Monticulipora (*Monotrypa*) *pavonia* Nicholson, Genus *Monticulipora*, 1881, p. 195, fig. 41, pl. 6, figs. 3, 3a.

Monotrypa pavonia Nicholson in Steinmann, Neues Jahrb. Min., Geol. Pal., 1, 1882, pl. 4, fig. 7.

Nicholsonia pavonia Waagen and Wenzel, Pal. Indica, 13th ser., 1886, p. 874.

Heterodictya pavonia Ulrich, Catal. Foss. Cincinnati Group, 1880, p. 10.

Escharopora pavonia Ulrich, Geol. Minnesota, 3, 1893, p. 167.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 240.—Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 571, pl. 20, figs. 3, 4; *ibid.*, 30, 1906, p. 37.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 156.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 832, pl. 16, fig. 6; pl. 29, fig. 6.

Cyclopora Jamesi Prout, Trans. St. Louis, Acad. Sci., 1, 1859, p. 578.

Stictopora clathratula James, Catal. Foss. Cincinnati Group (not defined).

Chætetes? clathratulus Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 509, pl. 30, figs. 1, 1b; Pal. Ohio, 2, 1875, p. 209, pl. 22, figs. 2, 2b; Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 91, pl. 5, figs. 9, 9a.

Maysville: Cincinnati, Ohio, and vicinity (Fairmount); Central Tennessee (Leipers).

Plesiotype.—Cat. No. 43725, U.S.N.M. (Ulrich).

Observation.—Boule and Thevenin have refigured D'Orbigny's so-called types of this species, but unfortunately chose a specimen of *Peronopora decipiens* for this purpose. D'Orbigny's original description and Edwards and Haime's figures leave no doubt that the author of this species had this abundant *Escharopora* in mind.

Escharopora ponderosa (Ulrich).

Ptilodictya ponderosa Ulrich, Amer. Geol., 1, 1888, p. 308.

Trenton (Upper): Covington, Kentucky.

Escharopora ramosa (Ulrich).

Ptilodictya ramosa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1888, p. 164, pl. 7, figs. 5, 5a.

Escharopora ramosa Ulrich, Geol. Minnesota, 3, 1893, p. 167.

Stones River (Lebanon): Lebanon, Tennessee.

Holotype.—Cat. No. 43727, U.S.N.M.

Escharopora recta Hall.

Escharopora recta Hall, Pal. New York, 1, 1847, p. 73, pl. 26, figs. 1a–g.—Hitchcock, Geol. Vermont, 1, 1861, p. 290, fig. 188.

Ptilodictya recta Emmons, Amer. Geology, 1, pt. 2, 1855, p. 205, pl. 7, figs. 1a–d.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 158, fig. 120a.—Chamberlain, Geol. Wisconsin, 1, 1883, p. 153, fig.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, p. 828, figs.

Trenton: Middleville and Jacksonburg, New York; Canada and Minnesota.

ESCHAROPORA RECTA Quenstedt. See *Escharopora falciformis*.

Escharopora recta-nodosa Hall.

Escharopora recta var. *nodosa* Hall, Pal. New York, 1, 1847, p. 73, pl. 26, fig. 2.
Trenton: Middleville and Jacksonburg, New York.

ESCHAROPORA SILURIANA Weller. See *Diplostenopora siluriana*.

Escharopora subrecta (Ulrich).

Ptilodictya subrecta Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 63.

Escharopora subrecta Ulrich, Geol. Minnesota, 3, 1893, p. 168, pl. 12, figs. 5-29.—Grabau and Shimer, N. A. Index Fossils, 1, p. 156, fig. 208f.—Baasler, Bull. U. S. Nat. Mus., 77, 1911, pp. 116, 117, fig. 44; Zittel-Eastman Textb. Pal., 1913, p. 344, fig. 504b.

Ptilodictya (*Escharopora*) *subrecta* Sardeson, Jour. Geol., 9, 1901, p. 159, pl. B, fig. 10.

Black River (Decorah): Minneapolis, etc., Minnesota; Decorah, Iowa; and Beloit, Wisconsin; Lake Nipissing, Ontario.

Ordovician (Wassaleu): Uxnorm, Esthonia, Russia.

Cotypes.—Cat. Nos. 43818, 43819, U.S.N.M.

ETAGRAPTUS Ruedemann. See *Tetragraptus* subgenus *Etagraptus*.

ETHMOPHYLLUM MINGANENSIS Walcott. See *Archæoscyphia minganensis*.

EUCALYPTOCRINITES Goldfuss. See *Eucalyptocrinus* Goldfuss.

EUCALYPTOCRINITES CONICUS Troost. See *Eucalyptocrinus milliganæ*.

EUCALYPTOCRINITES CRENATUS Troost. See *Eucalyptocrinus ventricosus*.

EUCALYPTOCRINITES FLORIDUS Troost. See *Eucalyptocrinus milliganæ*.

EUCALYPTOCRINITES LÆVIS Troost. See *Eucalyptocrinus phillipsi*.

EUCALYPTOCRINITES TENNESSEÆ Troost. See *Eucalyptocrinus ovalis*.

EUCALYPTOCEINUS Goldfuss.

Genotype: *E. rosaceus* Goldfuss.

Eucalyptocrinites Goldfuss, Petrefacta, 1826, p. 214, 2d ed., pt. 1, 1862, p. 199; Agg. Mem. Soc. Sci. Nat. Neuch., 1, 1835, p. 197; Nova Acta Physico Med., Acad. Caes. Leop.-Carol., 19, 1839, p. 335.—Müller, Berlin Acad. Wiss., 1841, p. 210.—Roemer, Rhein. Übergangegeb., 1843, p. 64.—D'Orbigny, Prodrome Pal., 1, 1850, p. 45.

Eucalyptocrinus Agassiz, Ann. Nat. Hist., 1, 1838, p. 447.—Hall, Pal. New York, 2, 1852, p. 207.—Quenstedt, Handb. Petref., 1852, p. 624.—McCoy, British Pal. Rocks and Fossils, 1854, p. 57.—Roemer, Leth. Geog. (Ausg. 3), 1855, p. 257.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 306.—Bronn, Klass. Thierr. (Actin.), 1860, pl. 27.—Dujardin and Hupe, Hist. Nat. Zooph. Echin., 1862, p. 115.—Allman, Trans. Royal Soc. Edinburgh, 23, 1864, p. 249, text. fig. 5.—Hall, 15th Rep. New York State Cab. Nat. Hist., 1865, p. 32.—Schultze, Mon. Echin. Eifel. Kalk., 1866, p. 90.—Hall, 20th Rep. New York State Cab. Nat. Hist. (extras, 1865), 1868, p. 321, fig. 2; rev. ed. for 1868, 1870, p. 363, figs. 1-2.—Angelin, Icon. Crinoid., 1878, p. 16.—Hall, 28th Rep. New York State Cab. Nat. Hist., 2d ed., 1879, pls. 16-19.—Wetherby, Jour. Cincinnati Soc. Nat. Hist., 1879 (Apr.), No. 5, p. 7.—Zittel, Handb. Pal., 1, 1879, p. 379.—Etheridge and Carpenter, Ann. Mag. Nat. Hist., 5th ser., 7, 1881, p. 296.—Quenstedt, Handb. Petrefact., 1885, p. 963.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, p. 349 (Rev. Pal., pt. 3, sec. 1, p. 127).—Miller, N. A. Geol. Pal., 1889, p. 243; Amer. Geol., 6, 1890, p.

EUCALYPTOCRINUS—Continued.

- 347.—Bather, Treatise on Zool., 3, Echinoderma, London, 1900, p. 164.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 102, fig. 46.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 148.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 157; Bull. New York State Mus., 45, 1901, p. 157.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 45.—Zittel, Grundzüge Pal., 1, 1910, p. 164.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 557.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 192.
- Hypanthocrinites Phillips, in Murchison's Sil. Syst., 1839, p. 672, pl. 17, fig. 3.
- Hypanthocrinus Hall, Pal. New York, 2, 1852, p. 178.—Salter, Cat. Camb. Sil. Foss., 1873, p. 119.—Angelin, Icon. Crin., 1878, p. 17.—Zittel, Handb. Pal., 1, 1879, p. 380.—Miller, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 141.

EUCALYPTOCRINUS ARMOSUS McChesney. See *Siphonocrinus armosus*.

Eucalyptocrinus asper Weller.

- Eucalyptocrinus asper* Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 110, pl. 5, figs. 4-7.
- Niagaran (Racine): Bridgeport and Hawthorne, Illinois.

Eucalyptocrinus cælatus (Hall).

- Hypanthocrinites cælatus Hall, Geol. New York, 4, 1843, p. 113, fig. 1; tab. 18, fig. 1.
- Eucalyptocrinus cælatus* D'Orbigny, Prodr. de Pal., 1, 1849, p. 45 (gen. ref.).—Hall, Pal. New York, 2, 1852, p. 210, pl. 47, figs. 4a-e.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 11, fig. 12.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 228, fig.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 336, pl. 83, figs. 5-7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 559.
- Eucalyptocrinus papulosus* Hall, Pal. New York, 2, 1852, p. 211, pl. 47, figs. 5a, b.
- Clinton (Rochester): Lockport, Rochester, etc., New York.

EUCALYPTOCRINUS CÆLATUS Hall (1882). See *Eucalyptocrinus elrodi* and *E. ventricosus*.

Eucalyptocrinus cælatus levis Grabau and Shimer.

- Hypanthocrinites decorus Hall (not Phillips), Nat. Hist. New York, Geol., 4, 1843, p. 133, fig. 2, 3; p. 144; tab. ill. 18, fig. 2.
- Hypanthocrinus decorus Marcou, Geol. Map United States and British Prov., etc., 1853, p. 27, pl. 2, fig. 8.
- Eucalyptocrinus decorus* Hall, Pal. New York, 2, 1852, p. 207, pl. 47, fig. 1, 2a-h, 3a-d; p. 352, pl. 85, fig. 7.—Jones, Geol. Surv. Canada, dec. 3, 1858, p. 23, fig. 3.—Emmons, Manual Geol., 1860, p. 110, fig. 100.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 7, fig. 6.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 229, figs.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 157, fig. 53; Bull. New York State Mus., 45, 1901, pp. 157, 158, fig. 53.
- Eucalyptocrinus cælatus* var. *levis* Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 559, figs. 1893 and 1894.
- Clinton (Rochester): Lockport and Rochester, New York; Ontario.

EUCALYPTOCRINUS CHICAGOENSIS Winchell and Marcy. See *Eucalyptocrinus crassus*.

EUCALYPTOCRINUS CONICUS Shumard. See *Eucalyptocrinus milliganæ*.

EUCALYPTOCRINUS CONSTRICTUS Hall. See *Eucalyptocrinus crassus*.

EUCALYPTOCRINUS CORNUTUS Wachsmuth and Springer. See *Callicrinus cornutus*.

EUCALYPTOCRINUS CORNUTUS var. **EXCAVATUS** Hall. See *Callicrinus cornutus*.

Eucalyptocrinus crassus Hall.

Eucalyptocrinus crassus Hall, Trans. Albany Inst., 4, 1863, p. 197.—Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 129, pl. 6, fig. 11.—Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed. for 1875, 1877, pl. 17, figs. 1-11; pl. 18, figs. 1-9; pl. 19, figs. 2, 4, 5; pl. 21, fig. 6; pl. 31, fig. 5; mus. ed., 1879, p. 141, pl. 17, figs. 1-11; pl. 18, figs. 1-9; pl. 19, figs. 2, 4, 5.—Wetherby, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, pl. 8, figs. 5-8; p. 7 footnote.—White, 2d Ann. Rep. Indiana Dep. Stat. Geol., 1880, p. 495, pl. 3, fig. 1.—Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 272, pl. 17, figs. 1-11; pl. 18, figs. 1-9; pl. 19, figs. 2, 4, 5.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 189, fig.—Miller, N. A. Geol. Pal., 1889, p. 244, fig. 302.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 342, pl. 81, figs. 1-6, 14, 15.—Weller, Bull. Chicago Acad. of Sci., 4, 1900, p. 105, pl. 5, figs. 1, 2; p. 25, text fig. 6.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 559, fig. 1895.

Eucalyptocrinus constrictus Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 273, pl. 15, fig. 1; Trans. Albany Inst., 10, 1883, p. 66.

Eucalyptocrinus chicagensis Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 90, fig.

Eucalyptocrinus sp. undet. Worthen, Geol. Surv. Illinois, 6, 1875, pl. 24, figs. 2, 2a.

Niagaran: Waldron, etc., Indiana; Newsom, Tennessee (Waldron); Chicago, Illinois (Racine).

EUCALYPTOCRINUS CRASSUS Hall, 1867. See *Eucalyptocrinus nodulosus*.

EUCALYPTOCRINUS DECORUS of American authors. See *Eucalyptocrinus cælatus lævis*.

Eucalyptocrinus depressus Miller.

Eucalyptocrinus depressus Miller, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 232, pl. 7, figs. 1-1b.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 114, pl. 7, figs. 5-7.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 349, pl. 83, figs. 3, 4a, 4b.

Niagaran (Racine): Cicero and Bridgeport, near Chicago, Illinois.

Eucalyptocrinus egani (Miller).

Eucalyptocrinus (*Hypanthocrinus*) *egani* Miller, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 140, pl. 4, figs. 1-1c.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 108, pl. 7, fig. 4.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 352, pl. 82, figs. 11, 12.

Niagaran (Racine): Near Chicago, Illinois.

Eucalyptocrinus ellipticus Miller.

Eucalyptocrinus ellipticus Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 648, pl. 7, fig. 4 (adv. sheets, 1891, p. 38).

Niagaran (Waldron): Hartsville, Indiana.

Eucalyptocrinus elrodi Miller.

Eucalyptocrinus elrodi Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 650, pl. 7, figs. 9, 10 (adv. sheets, 1891, p. 40); N. A. Geol. Pal., 2d App., 1897, p. 745, figs. 1351, 1352.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 339, pl. 81, fig. 7a, 8-13.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 559, fig. 1896.

Eucalyptocrinus elrodi—Continued.

Eucalyptocrinus cælatus Hall, Trans. Alb. Inst., 4, 1863, p. 226; 20th Rep. New York State Cab. Nat. Hist. (extras, 1865), 1868, p. 321, fig. 1; p. 329; rev. ed., 1870, p. 366; 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, pl. 16, figs. 1–10; pl. 19, figs. 1, 3, 6, 7; mus. ed., 1879, p. 142, pl. 16, figs. 1–10; pl. 19, figs. 1, 3; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 274, pl. 15, fig. 2; pl. 16, figs. 1–10; pl. 19, figs. 1, 3.

Eucalyptocrinus subglobosus Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 647, pl. 7, fig. 3 (adv. sheets, 1891, p. 37); N. A. Geol. Pal., 2d App., 1897, p. 745, fig. 1354.

Niagaran (Waldron): Hartsville and Waldron, Indiana; Newsom, Tennessee.

Eucalyptocrinus extensus (Troost).

Eucalyptocrinites extensus Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

Eucalyptocrinus extensus Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 370.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 49, pl. 13, figs. 9, 10.

Niagaran (Brownsport): Decatur County, Tennessee.

Holotype.—Cat. No. 39961, U.S.N.M.

Eucalyptocrinus gibbosus (Troost).

Eucalyptocrinites gibbosus Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 61 (nom. nud.).

Eucalyptocrinus gibbosus Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 370.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 54, pl. 10, figs. 3, 4.

Niagaran (Brownsport): Decatur County, Tennessee.

Holotype.—Cat. No. 39959, U.S.N.M.

Eucalyptocrinus goldfussi (Troost).

Eucalyptocrinites Goldfussi Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

Eucalyptocrinus goldfussi Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 370.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 52, pl. 15, figs. 5, 6.

Niagaran (Brownsport): Decatur County, Tennessee.

Holotype.—Cat. No. 39953, U.S.N.M.

EUCALYPTOCRINUS GORBYI Miller. See *Eucalyptocrinus magnus*.

Eucalyptocrinus inconspicetus Ringueberg.

Eucalyptocrinus inconspicetus Ringueberg, Proc. Acad. Nat. Sci. Philadelphia, 1884, p. 148, pl. 3, fig. 5.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 346, pl. 83, fig. 1, 2.

Niagaran (Lockport): Lockport, New York.

Eucalyptocrinus inornatus Weller.

Eucalyptocrinus inornatus Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 15, pl. 6, figs. 3, 4.

Niagaran (Racine): Bridgeport and Hawthorne, Illinois.

EUCALYPTOCRINUS LAEVIS Shumard. See *Eucalyptocrinus phillipsi*.

Eucalyptocrinus lindahl Wachsmuth and Springer.

Eucalyptocrinus lindahl Wachsmuth and Springer, Amer. Geol., 10, 1892, p. 139; Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 347, pl. 82, fig. 9.—Foerste, Jour. Geol., 11, 1903, p. 712.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 47, pl. 12, figs. 5, 6.

Eucalyptocrinus lindahli—Continued.

Eucalyptocrinus wortheni Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 3, 1893, p. 53, pl. 4, fig. 2.

Eucalyptocrinites splendidus Troost (not Hall and Whitfield), Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419 (nom. nud.); Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

Niagaran (Brownsport): Wayne County, Tennessee.

Pteriotype.—Cat. No. 39962, U.S.N.M. (Troost's type of *E. splendidus*).

Eucalyptocrinus magnus Worthen.

Eucalyptocrinus magnus Worthen, Geol. Surv. Illinois, 6, 1875, p. 501, pl. 25, fig. 3.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 348, pl. 82, figs. 7, 8.—Weller, Bull. Chicago Acad. Sci., 4, 1900, p. 116, pl. 6, fig. 7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 560.

Eucalyptocrinus gorbyi Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1892, p. 649, pl. 7, figs. 5, 6 (adv. sheets, 1891, p. 39); N. A. Geol. Pal., 2d App., 1897, p. 745, fig. 1353.

Niagaran: Wayne County and Newsom, Tennessee (Waldron); Hawthorne, Illinois (Racine).

Eucalyptocrinus milliganæ Miller and Gurley.

Eucalyptocrinites conicus Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 61 (nom. nud.).

Eucalyptocrinus conicus Shumard, Trans. Acad. Sci. St. Louis, 2, No. 2, 1866, p. 370.

Eucalyptocrinites floridus Troost, MS., 1850.

Eucalyptocrinus milliganæ Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 10, 1896, p. 88, pl. 5, figs. 4-6.

Eucalyptocrinus milligani Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 558, fig. 1892.—Wood, Bull., U. S. Nat. Mus., 64, 1909, p. 50, pl. 5, fig. 13.

Niagaran (Brownsport): Decatur County, Tennessee.

Pteriotypes.—Cat. Nos. 39957, 39958, U.S.N.M. (Troost's type of *E. conicus* and *E. floridus*).

Eucalyptocrinus muralis Ringueberg.

Eucalyptocrinus muralis Ringueberg, Annals New York Acad. Sci., 5, 1890, p. 305, pl. 3, fig. 3.

Niagaran (Lockport-Gasport member): Lockport, New York.

Eucalyptocrinus nashvillæ (Troost).

Eucalyptocrinites Nashvillæ Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

Eucalyptocrinus nashvillæ Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 370.—Wood, Bull., U. S. Nat. Mus., 64, 1909, p. 53, pl. 15, figs. 7, 8.

Niagaran (Brownsport): Decatur County, Tennessee.

Holotype.—Cat. No. 39955, U.S.N.M.

Eucalyptocrinus nodulosus Weller.

Eucalyptocrinus nodulosus Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 109, pl. 7, figs. 1-3.

Eucalyptocrinus crassus Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 323, pl. 11, fig. 2; rev. ed., 1870, p. 365, pl. 11, fig. 2.

Niagaran (Racine): Bridgeport and Romeo, Illinois.

Eucalyptocrinus obconicus Hall.

Eucalyptocrinus obconicus Hall, 20th Rep. New York State Cab. Nat. Hist., 1867 (extras, 1865), p. 323, pl. 11 (2), fig. 1; rev. ed. 1870, p. 365, pl. 11, fig. 1.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 191, fig.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 353, pl. 83, fig. 13.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 109, pl. 7, fig. 8.—Slocum, Field Col. Mus., 2, Geol. Series, 1908, p. 301, pl. 86, figs. 1, 2.

Niagaran (Racine): Racine, Wisconsin; Chicago, Illinois.

Eucalyptocrinus ornatus Hall.

Eucalyptocrinus ornatus Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 20.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 91.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868 (extras, 1865), p. 329, pl. 11, figs. 4, 5; rev. ed., 1870, p. 366, pl. 11, figs. 4, 5.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 191, fig.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 340, pl. 82, fig. 10.—Weller, Bull. Chicago Acad. Sci., 4, 1900, p. 111, pl. 6, figs. 5, 6.

Niagaran (Racine): Racine, Wisconsin; Bridgeport and Romeo, Illinois.

Eucalyptocrinus ovalis Hall.

Eucalyptocrinites ovalis Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

Eucalyptocrinus ovatus Hall (in error for *E. ovalis*), 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, 1877, pl. 17, figs. 11, 12; mus. ed., 1879, p. 143, pl. 17, figs. 12, 13.

Eucalyptocrinus ovalis Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1882, p. 275, pl. 17, figs. 12, 13.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 344, pl. 82, figs. 1-6.—Grabau, Amer. Jour. Sci., 16, 1903, p. 299.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 48, pl. 11, fig. 3.

Eucalyptocrinites Tennesseæ Troost, Amer. Jour. Sci. Arts., 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 61 (nom. nud.).—Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 370.

Niagaran: Decatur and Perry Counties, Tennessee (Brownsport); Waldron and Hartsville, Indiana; Newsom, Tennessee (Waldron).

Plesiotypes.—Cat. No. 39952, U.S.N.M. (Troost's type of *E. ovalis*).

EUCALYPTOCRINUS OVATUS Hall. See *Eucalyptocrinus ovalis*.

EUCALYPTOCRINUS PAPULOSUS Hall. See *Eucalyptocrinus cælatus*.

Eucalyptocrinus phillipsi (Troost).

Eucalyptocrinites lævis Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.)

Eucalyptocrinus lævis Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 370.

Eucalyptocrinites Phillipsii Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

Eucalyptocrinus phillipsi Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 370.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 51, pl. 10, figs. 9, 10; pl. 13, figs. 2, 3, 4.

Niagaran (Brownsport): Decatur County, Tennessee.

Holotype and *plesiotype*.—Cat. Nos. 39964, 39966, U.S.N.M. (Troost's types of *E. lævis* and *E. phillipsi*).

Eucalyptocrinus proboscidealis Miller.

Eucalyptocrinus proboscidealis Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 224, pl. 9, fig. 2.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 352, pl. 82, fig. 14.

Niagaran (Guelph): Pontiac, Ohio.

EUCALYPTOCRINUS RAMIFER Roemer. See *Callicrinus ramifer*.

Eucalyptocrinus rotundus Miller.

Eucalyptocrinus rotundus Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 82, pl. 3, figs. 4, 4b.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 350.—Weller, Bull. Chicago Acad. Sci. Nat. Hist. Surv., 4, pt. 1, 1900, p. 113, pl. 5, fig. 3.

Niagaran (Racine): Near Chicago, Illinois.

Eucalyptocrinus splendidus Hall and Whitfield.

Eucalyptocrinus splendidus Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 128, pl. 6, fig. 12.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 350.

Niagaran (Guelph): Springfield, Ohio.

EUCALYPTOCRINUS SPLENDIDUS Troost. See *Eucalyptocrinus lindahli*.

Eucalyptocrinus springeri Foerste.

Eucalyptocrinus springeri Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 99, pl. 4, fig. 73.

Niagaran (Waldron): Newsom, Tennessee.

EUCALYPTOCRINUS SUBGLOBOSUS Miller. See *Eucalyptocrinus elrodi*.

EUCALYPTOCRINUS TENNESSEÆ Shumard. See *Eucalyptocrinus ovalis*.

Eucalyptocrinus tuberculatus Miller and Dyer.

Eucalyptocrinus tuberculatus Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 36, pl. 2, figs. 9, 9a.—Miller, N. A. Geol. Pal., 1889, p. 244, fig. 303.—Wachsmuth and Springer, Mem. Mus. Zool. Harvard, 20, 1897, p. 337, pl. 83, figs. 8–10.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 560.

Niagaran (Waldron): Waldron and Hartsville, Indiana; Newsom, Tennessee.

Eucalyptocrinus turbinatus Miller.

Eucalyptocrinus turbinatus Miller, Cincinnati Soc. Nat. Hist., 5, 1882, p. 82, pl. 3, figs. 5, 5a.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 351, pl. 82, fig. 13.—Weller, Bull. Chicago Acad. Sci. Nat. Hist. Surv., 4, pt. 1, 1900, p. 107, pl. 6, figs. 1, 2.

Niagaran (Racine): Near Chicago, Illinois.

Eucalyptocrinus ventricosus Wachsmuth and Springer.

Eucalyptocrinus ventricosus Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 341, pl. 83, figs. 11, 12.—Foerste, Jour. Geol., 11, 1903, p. 712.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 54.

Eucalyptocrinus cælatus Roemer (not Hall, 1843), Sil. Fauna West. Tennessee, Breslau, 1860, p. 48, pl. 4, figs. 3a–e.

Eucalyptocrinites crenatus Troost MS., 1850.

Niagaran (Brownport): Decatur County, Tennessee.

Pteriotype.—Cat. No. 39956 U.S.N.M. (Troost's type of *E. crenatus*).

EUCALYPTOCRINUS WORTHENI Miller and Gurley. See *Eucalyptocrinus lindahli*.

EUCHASMA Billings.

Genotype: *Conocardium blumenbachi* Billings.

Euchasma Billings, Geol. Surv. Canada, Pal. Foss., 1, 1865, p. 360.

Euchasma blumenbachi (Billings).

Conocardium Blumenbachii Billings, Canadian Nat. Geol., 4, 1859, p. 350; Geol. Canada, Geol. Surv. Canada, 1863, p. 113, fig. 22a, b.

Euchasma blumenbachi—Continued.

Euchasma Blumenbachia Billings, Geol. Surv. Canada, Pal. Foss., 1, 1865, pp. 220, 361, fig. 348.

Canadian: Mingan Islands, Canada; Port aux Choix, Table Head, and Cape Norman, Newfoundland (Quebec—G. H.).

EUCHEIROCRINUS Meek and Worthen. Genotype: *Cheirocrinus chrysalis* Hall.

Eucheirocrinus Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1869, p. 73; Geol. Surv. Illinois, 5, 1873, pp. 443, 502.—Bather, Kongl. Sv. Vet. Akad. Handl., 25, No. 2, 1893, pp. 21, 61, fig. 13b; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 148, figs. 61, 62.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 154.—Springer, *ibid.*, 2d ed., 1913, p. 213.

Cheirocrinus Hall (not Eichwald), 13th Rep. New York State Cab. Nat. Hist., 1860, p. 122.—Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 358.—Meek and Worthen, Geol. Surv. Illinois, 5, 1873, p. 443.

Calceocrinus Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 562.—Miller, N. A. Geol. Pal., 1889, p. 230; 2d App., 1897, p. 740.

Proclivocrinus Ringueberg, Ann. New York Acad. Sci., 4, 1889, p. 396, pl. 11, figs. 2, 4.—Bather, Ann. Mag. Nat. Hist., 6th Ser., 5, 1890, p. 332, pl. 14, fig. 10; Treatise on Zool. (Lankester), pt. 3, 1900, p. 148. (Genotype: *Calceocrinus radiculatus* Ringueberg.)

Eucheirocrinus chrysalis (Hall).

Cheirocrinus chrysalis Hall, 13th Rep. New York State Cab. Nat. Hist., 1860, p. 123, figs. 1-5.

Calceocrinus chrysalis Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 358.—Hall, 28th Rep. New York State Mus. Nat. Hist., Mus. ed., 1879, p. 147, fig. 2; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 281, fig. 2.

Proclivocrinus chrysalis Ringueberg, Annals New York Acad. Sci., 4, 1889, p. 399, pl. 10, figs. 7, 13.

Cremacrinus chrysalis Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, pp. 111, 113 (gen. ref.).

Clinton (Rochester): Lockport, New York.

Eucheirocrinus radiculatus (Ringueberg).

Calceocrinus radiculatus Ringueberg, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 120, pl. 5, figs. 3, 3a.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 503.

Cremacrinus radiculatus Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, pp. 111, 113 (gen. ref.).

Proclivocrinus radiculatus Ringueberg, Annals New York Acad. Sci., 4, 1889, p. 397, pl. 10, fig. 6.

Clinton (Rochester): Lockport, New York.

Observation.—Probably the same as *E. chrysalis* (Hall).

EUCONIA Ulrich.

Genotypes: *Pleurotomaria etna* and *P. ramsayi* Billings.

Euconia Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 953.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 642.

Euconia amphitrite (Billings).

Pleurotomaria Amphitrite Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 32. (Adv. sheets, 1862.)

Euconia amphitrite Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 954 (gen. ref.).—Raymond, Ann. Carnegie Mus., 4, 1908, p. 216.

Chazy (Mingan): South Point of Large Island, Mingan Islands, Canada.

Euconia beekmanensis (Whitfield).

Pleurotomaria Beekmanensis Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 53, pl. 8, figs. 8-11.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 704, figa.—Koken, Neues Jahrb. Min., Geol. Pal., 6, Beilage-Band, 1889, p. 478.

Euconia beekmanensis Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 954 (gen. ref.).

Canadian (Beekmantown): Beekmantown, New York.

Euconia etna (Billings).

Pleurotomaria Etna Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 226, figs. 210, a, b.—Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 316, pl. 24, figs. 12, 13.—Seely, Vermont State Geol., Rep. 7, 1910, pl. 62, figs. 12, 13.

Euconia etna Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 954 (gen. ref.).—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 642, fig. 873.

Canadian (Quebec—G, H): Cape Norman and Table Head, Newfoundland.

Euconia? pervetusta (Conrad).

Cyclostoma? pervetusta Conrad, Ann. Rep. New York State Geol. Surv., 1838, p. 113; *ibid.*, 1839, p. 65.

Pleurotomaria pervetusta Hall, Rep. Geol. 4th Dist., New York, 1843, p. 48, figs. 1, 2.—Owen, Amer. Jour. Sci. Arts, 48, 1845, p. 300, figs. 1, 2.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 5, figs. 1, 2.—Hall, Pal. New York, 2, 1852, p. 12, pl. 4 (bis), figs. 3a-d.—Grabau, Bull. New York State Mus., 45, 1901, p. 213, fig. 143; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 213, fig. 143.

Euomphalus pervetustus Hall, Geol. New York, 4, 1843, p. 48, figs. 1, 2; tab. ill. 2, figs. 1, 2.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 231.

Straparollus pervetustus D'Orbigny, Prodr. de Pal., 1, 1849, p. 30 (gen. ref.).

Cyclonema pervetusta Whitfield and Hovey, Bull. Amer. Mus. Nat. Hist., 11, pt. 2, 1899, p. 162 (gen. ref.).

Euconia(?) pervetusta Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 642, fig. 874.

Upper Medinan: Medina and Lockport, New York.

Euconia ramsayi (Billings).

Pleurotomaria Ramsayi Billings, Canadian Nat. Geol., 4, 1859, p. 351, figs. 3, 4; Geol. Canada, Geol. Surv. Canada, 1863, p. 117, figs. 26a, b.—Miller, N. A. Geol. Pal., 1889, p. 422, fig. 701.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 714, figs.

Euconia ramsayi Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 954 (gen. ref.).—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 642.

Canadian (Romaine): Mingan Islands, Canada.

EUCRINUS Angelin. See *Dimerocrinus* Phillips.

EUGASTER Hall. See *Eugasterella* Schuchert.

EUGASTERELLA Schuchert.

Genotype: *Eugaster logani* Hall.

Eugaster Hall (not Seville, 1839), 20th Rep. New York State Cab. Hist., 1868, p. 290; rev. ed., 1870, p. 332.—Zittel, Handb. Pal., 1, 1879, p. 444.—Stürtz, Neues Jahrb. Min., Geol. Pal., 2, 1886, p. 151; Palaeontographica, 32, 1886, pp. 78, 83.—Miller, N. A. Geol. Pal., 1889, p. 244.—Stürtz, Verh. naturh. Ver. preuss. Rheinl., etc., 1893, p. 20.—Gregory, Proc. Zool. Soc. London, 1897, p. 1035.

Eugasterella Schuchert, in Frech, Foss. Cat., 1, Anim., pt. 3, 1914, p. 19; Bull. U. S. Nat. Mus., 88, 1915, p. 237.

Eugasterella concinna (Ringueberg).

Eugaster concinnus Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, 1886, p. 8, pl. 1, fig. 3.

Eugasterella(?) *concinna* Schuchert, in Frech, Foss. Cat. 1, Anim., pt. 3, 1914, p. 19; Bull. U. S. Nat. Mus., 88, 1915, p. 239.

Clinton (Rochester): Lockport, New York.

EUGYRICHNITES Ami.

Genotype: *E. minutus* Ami.

Eugyrichnites Ami, Summary Rep. Geol. Surv. Canada, for 1904, 1905, p. 291.

Eugyrichnites minutus Ami.

Eugyrichnites minutus Ami, Summary Rep. Geol. Surv. Canada for 1904, 1905, p. 291.

Horizon uncertain: Tapley's Mill, near Woodstock, New Brunswick.

EUNEMA Salter. See *Trochonema* subgenus *Eunema*.

EUNEMA HISTORICUM Hudson. See *Gyronema historicum*.

EUNEMA LEPTONOTUM Raymond. See *Gyronema leptonotum*.

EUNEMA? **PAGODA** Salter. See *Ectomaria pagoda*.

EUNEMA PRISCA Billings. See *Ectomaria prisca*.

EUNICITES Ehlers.

Genotype: *E. avitus* Ehlers.

Eunicites Ehlers, Palæontographica, 17, 1868, p. 147.—Zittel, Handb. Pal., 1, 1880, p. 565.—Miller, N. A. Geol. Pal., 1889, p. 518.—Grabau and Shimer, N. A. Index Fossils, 1910, 2, p. 241.

Eunicites chiromorphus Hinde.

Eunicites chiromorphus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 381, pl. 20, fig. 10.

Upper Medinan (Cataract): Toronto, Ontario.

Eunicites clintonensis Hinde.

Eunicites clintonensis Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 381, pl. 19, fig. 21.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 242, fig. 1532a.

Upper Medinan (Cataract): Toronto, Ontario.

Eunicites confinis Foerste.

Eunicites confinis Foerste, Amer. Geol., 2, 1888, p. 418, fig. 6; Geol. Surv. Ohio, Pal., 7, 1893, p. 517, fig. 6.

Richmond (Elkhorn): Todds Fork, Clinton County, Ohio.

Eunicites contortus Hinde.

Eunicites contortus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 375, pl. 18, fig. 4.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 241, fig. 1530d.

Cincinnati (Pulaski): Toronto, Ontario.

Eunicites coronatus Hinde.

Eunicites coronatus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 381, pl. 20, fig. 9.

Upper Medinan (Cataract): Toronto, Ontario.

EUNICITES CRISTATUS Miller. See *Arabellites cristatus*.

Eunicites? digitatus Hinde.

Eunicites? digitatus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 376, pl. 19, fig. 3.

Cincinnatian (Pulaski): Toronto, Ontario.

Eunicites falcatus Foerste.

Eunicites falcatus Foerste, Amer. Geol., 2, 1888, p. 418, fig. 5; Geol. Surv. Ohio, Pal., 7, 1893, p. 517, fig. 5.

Richmond (Elkhorn): Todds Fork, Clinton County, Ohio.

Eunicites gracilis Hinde.

Eunicites gracilis Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 376, pl. 19, fig. 3.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 242, fig. 1528c.

Cincinnatian (Pulaski): Toronto, Ontario.

Eunicites paululus Foerste.

Eunicites paululus Foerste, Amer. Geol., 2, 1888, p. 418, fig. 7; Geol. Surv. Ohio, Pal., 7, 1893, p. 517, fig. 7.

Richmond (Elkhorn): Todds Fork, Clinton County, Ohio.

Eunicites major Hinde.

Eunicites major Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 374, pl. 18, fig. 1.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 241, fig. 1530a.

Enonites major Miller, N. A. Geol. Pal., 1889, p. 519 (gen. ref.).

Cincinnatian (Pulaski): Toronto, Ontario.

Eunicites perdentatus Hinde.

Eunicites perdentatus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 375, pl. 18, fig. 6.

Lumbriconereites perdentatus Miller, N. A. Geol. Pal., 1889, p. 519 (gen. ref.).

Cincinnatian (Pulaski): Toronto, Ontario.

Eunicites simplex Hinde.

Eunicites simplex Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 376, pl. 19, fig. 2.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 242, fig. 1528b.

Cincinnatian (Pulaski): Toronto, Ontario.

EUNICITES (NEREIDAVUS) VARIANS Hinde. See *Nereidavus varians*.**EUNOA** Clarke.

Genotype: *E. accola* Clarke.

Eunoa Clarke, Bull. New York State Mus., 52, 1902, p. 606.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 377.

Eunoa accola Clarke.

Eunoa accola Clarke, Bull. New York State Mus., 52, 1902, p. 607, pls. 5, 6.

Canadian (Deepkill): Deepkill, Rensselaer County, New York.

EUOMPHALOPTERUS Roemer.

Genotype: *Euomphalus alatus* Hisinger.

Euomphalopterus Roemer, Leth. geog. 1, Leth. Pal., 1876, Atlas, Expl., pl. 14, fig. 9a.—Zittel, Handb. Pal., 2, 1882, p. 206.—Koken, Neues Jahrb. f. Min., Geol., Pal., 6 Beilage-Band, 1889, p. 438; Neues Jahrb. f. Min., Geol., Pal., 1, 1893, p. 15; Die Leitfossilien, Leipzig, 1896, p. 102, text fig. 80.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 932.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 629.—Dall, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 527,

***Euomphalopterus alatus americanus* Kindle and Breger.**

Euomphalopterus alatus var. *americanus* Kindle and Breger, 28th Ann. Rep.

Dept. Geol. Nat. Res. Indiana, 1904, p. 459, pl. 13, fig. 6.

Euomphalopterus alatus var. Kindle and Breger, *ibid.*, 1904, p. 461.

Niagaran: Little Deer Creek, Carroll County, Indiana.

***Euomphalopterus alatus limatoldeus* Kindle and Breger.**

Euomphalopterus alatus var. *limatoldeus* Kindle and Breger, 28th Ann. Rep.

Dep. Geol. Nat. Res. Indiana, 1904, p. 461, pl. 14, fig. 4.

Niagaran: Delphi, Indiana.

***Euomphalopterus alatus obsoletus* Ulrich.**

Euomphalopterus alatus-obsoletus Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 84, figs. 5g-i.

Niagaran (Waldron): Waldron, Indiana.

***Euomphalopterus elora* (Billings).**

Pleurotomaria Elora Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 343, fig. 348; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 154, fig. 135 (adv. sheet 1861).—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 708, fig.—

Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, p. 74, pl. 11, figs. 5, 6.

Euomphalopterus Elora Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 331.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 630, fig. 853.

Niagaran (Guelph): Elora, Ontario.

***Euomphalopterus halei* (Hall).**

Pleurotomaria halei Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 34.—Wichell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 109.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, pp. 344, 364, pl. 15 (6), figs. 13, 14 (extras, 1865); rev. ed., 1870, p. 392, pl. 15, figs. 13, 14, p. 432.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 73, pl. 10, figs. 2, 2a.

Eotomaria halei Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 69 (gen. ref.).

Trochonema halei Miller, N. A. Geol. Pal., 1889, p. 428 (gen. ref.).

Euomphalopterus Halei Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 330 (gen. ref.).

Niagaran: Racine, Wisconsin; Bridgeport, Illinois (Racine); Durham, Ontario; and Wisconsin (Guelph).

***Euomphalopterus tyrrelli* Parks.**

Euomphalopterus tyrrelli Parks in Tyrrell, 22d Rep. Ontario Bur. Mines, 1911, p. 36.

Niagaran (Guelph): Severn River, Ontario.

***Euomphalopterus valeria* (Billings).**

Pleurotomaria Valeria Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 169.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 23, pl. 4, figs. 1, 1a; *ibid.*, pt. 2, 1895, p. 71, pl. 11, figs. 2, 3.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 721, figs.

Euomphalopterus Valeria Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 4, 1906, p. 330 (gen. ref.).—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1908, p. 191, pl. 28.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 630, figs. 851h, j, 852.

Niagaran (Guelph): Gault, etc., Ontario; Ohio.

Upper Monroan (Lucas): Salt shaft, Detroit, Michigan.

Euomphalopterus velaris Whiteaves.

Pleurotomaria velaris Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 72, pl. 11, figs. 4, 4a.

Euomphalopterus velaris Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 330 (gen. ref.).

Pleurotomaria cf. *velaris* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 193, pl. 23, figs. 1-2.

Niagaran (Guelph): Elora, Ontario.

?Upper Monroan (Anderdon): Near Amherstburg, Ontario.

EUOMPHALUS McCoy.

Genotype: *E. pentagonalis* McCoy.

Euomphalus McCoy, Syn. Char. Carb. Foss. Ireland, 1844, p. 34.—Brown, Illust. Foss. Conch. Great Britain and Ireland, 1849, p. 81.—King, Mon. Permian Foss. England, Pal. Soc., 1850, p. 211.—Woodward, Man. Mollusca, pt. 1, 1851, p. 145.—McCoy, British Pal. Rocks Foss., 1854, p. 297.—Pictet, Traite de Pal., 2d ed., 3, 1855, p. 153.—Goldfuss, Petrefacta Germ., 2d ed., pt. 3, 1863, p. 75.—Meek and Worthen, Geol. Surv. Illinois, 2, p. 158.—Waagen, Mem. Geol. Surv. India, Pal. Indica, ser. 13, 1, p. 86.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 19, No. 6, 1881, p. 136.—Koninck, Ann. d. Mus., Royal d'Hist. Nat. de Belgique, 6, 1881, p. 136.—Zittel, Handb. Pal., 2, 1882, p. 206.—Nettelroth, Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 181.—Koken, Neues Jahrb. f. Min., Geol. Pal., 6 Beilage-Band, 1889, p. 317.—Whidborne, Mon. Dev. Fauna South England, 1, Pal. Soc., 1891, p. p. 244.—Koken, Die Leitfossilien, Leipzig, 1896, p. 104, fig. 86, p. 106.—Pilsbry, Zittel-Eastman Textb. Pal., 1900, p. 446.—Dall, ibid., 2d ed., 1913, p. 527.

EUOMPHALUS (part) of authors. See *Eccyliopterus* Remele and *Oxydiscus* Koken, and *Poleumita* Clarke and Ruedemann.

EUOMPHALUS ALATUS var. **LIMATOIDEA** Kindle and Breger. See *Euomphalopterus alatus limatoideus*.

EUOMPHALUS CALCIFERUS Whitfield. See *Eccyliomphalus calciferus*.

EUOMPHALUS CIRCINATUS Whiteaves. See *Eccyliomphalus circinatus*.

Euomphalus?? circumliratus Whitfield.

Euomphalus circumliratus Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 308, pl. 24, figs. 18-21.—Seely, Vermont State Geol., Rep., 7, 1910, pl. 62, figs. 18-21.

Canadian (Beekmantown): Fort Cassin, Vermont.

Euomphalus expansus Conrad.

Not recognized.

Euomphalus expansus Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 273.

Niagaran: Near Rome, New York, and Pendleton, Indiana.

Euomphalus fairchildi Clarke and Ruedemann.

Euomphalus fairchildi Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 75, pl. 8, figs. 3, 4.

Euomphalus cf. *fairchildi* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 186, pl. 16, fig. 28.

Niagaran (Guelph): Rochester, New York.

?Upper Monroan (Lucas): Detroit, Michigan.

Euomphalus galtensis Whiteaves.

Euomphalus galtensis Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 21, pl. 3, figs. 9, 9a; *ibid.*, pt. 2, 1895, p. 85.

Niagaran (Guelph): Galt, Hespeler, and Durham, Ontario.

EUOMPHALUS GYROCERAS Roemer. See *Eccyliomphalus gyroceras*.

EUOMPHALUS HEMISPHERICUS Hall. See *Diaphorostoma hemisphericum*.

Euomphalus inornatus (Whiteaves).

Trochonema inornatum Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 19, pl. 3, fig. 7.—Leeley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1230, fig.

Euomphalus inornatus Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 85, pl. 13, fig. 1.

Niagaran (Guelph): Elora and Durham, Ontario.

EUOMPHALUS MACLURII Troost. See *Maclurites magnus*.

EUOMPHALUS MACROLINEATUS Whitfield. See *Poleumita macrolineata*.

EUOMPHALUS MICHLERANUS Hall. See *Eccyliopteris? michleranus*.

EUOMPHALUS MINNESOTENSIS Miller. See *Raphistoma minnesotense*.

Euomphalus? minutissimus Castelnau.

Euomphalus? minutissimus Castelnau, *Essai Syst. Sil. l'Amerique Septent.*, 1843, p. 35, pl. 11, fig. 9.

Ordovician?: Trenton, New York.

Observation.—Not recognized. Probably internal cast of some small shell.

EUOMPHALUS (STRAPAROLLUS?) MORSUS Whitfield. See *Straparollus morsus*.

EUOMPHALUS PEPINENSIS Meek. See *Raphistoma pepinensis*.

EUOMPHALUS PERKINSI Whitfield. See *Eccyliomphalus perkinsi*.

Euomphalus pervetus (Conrad).

Not recognized.

Inachus pervetus Conrad, Proc. Acad. Nat. Sci., Philadelphia, 1843, p. 334.

Euomphalus pervetus Miller, N. A. Geol. Pal., 1889, p. 404.

Lead-bearing limestone: Mineral Point, Wisconsin.

EUOMPHALUS PERVETUSTUS Hall. See *Euconia? pervetusta*.

EUOMPHALUS POLYGYRATUS Roemer. See *Polygyrata polygyratus*.

EUOMPHALUS (RAPHISTOMA) ROTULIFORMIS Meek. See *Polygyrata rotuliformis*.

EUOMPHALUS (CYCLONEMA) RUGÆLINEATA Hall and Whitfield. See *Poleumita rugilineata*.

EUOMPHALUS SANCTISABÆ Roemer. See *Straparollus sanctisabæ*.

EUOMPHALUS SINUATUS Hall. See *Straparollus sinuatus*.

EUOMPHALUS STRONGI Whitfield. See *Sinuopea strongi*.

EUOMPHALUS SULCATUS Hall. See *Poleumita? sulcata*.

Euomphalus triliratus Conrad.

Not recognized.

Euomphalus triliratus Conrad, Proc. Acad. Nat. Sci. Philadelphia, 1, 1843, p. 333.
Trenton: Mineral Point, Wisconsin.

EUOMPHALUS (RAPHISTOMA?) TROCHISCUS Meek. See *Polygyrata trochiscus*.

EUOMPHALUS UNIANGULATUS Hall. See *Helicotoma uniangulata*.

EUOMPHALUS? VATICINUS Hall. See *Raphistoma minnesotense*.

Euomphalus verneuili Castelnau.

Euomphalus Verneuili Castelnau, *Essai Syst. Sil. l'Amerique Septent.*, 1843, p. 34, pl. 11, figs. 1a, b.

Silurian: Northern shore of Lake Huron.

Euomphalus winonensis Sardeson.

Euomphalus winonensis Sardeson, *Bull. Minnesota Acad. Nat. Sci.*, 4, 1896, p. 96, pl. 6, fig. 1.

Ozarkian (Oneota): Near Dresbach, Winona County, and near Red Wing, Goodhue County, Minnesota; Blanchardville, Wisconsin.

EURYPHILINA Ulrich.

Genotype: *E. reticulata* Ulrich.

Euryphilina Ulrich, *Cont. Micro-Pal., Geol. Surv. Canada*, pt. 2, 1889, p. 52.—Vogdes, *Annals New York Acad. Sci.*, 5, 1889, facing p. 36.—Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 13, pt. 1, 1890, pp. 125, 126.—Jones, *Quart. Jour. Geol. Soc. London*, 46, 1890, p. 538.—Miller, *N. A. Geol. Pal.*, 1st App., 1892, p. 707.—Ulrich, *Geol. Minnesota*, 3, pt. 2, 1894, p. 658; *Zittel-Eastman Textb. Pal.*, 1, 1900, p. 644.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1040.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 348.—Bassler, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 738.

Euryphilina aequalis Ulrich.

Euryphilina aequalis Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 13, 1890, p. 129, pl. 9, figs. 5-8.

Euryphilina equalis Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 348 figs. 1657q-s.

Stones River (Ridley?): Bottom of gorge at High Bridge, Kentucky; Lebanon, Tennessee.

Cotypes.—Cat. No. 41639, U.S.N.M.

Euryphilina billingsi (Jones).

Primitia billingsi Jones, *Quart. Jour. Geol. Soc. London*, 46, 1890, p. 547, pl. 21, fig. 10.

Anticostian (Gun River and Jupiter River): West of Jupiter River, Anticosti.

Euryphilina bulbifera Ruedemann.

Euryphilina bulbifera Ruedemann, *Bull. New York State Mus.*, 49, 1901, p. 76, pl. 5, figs. 14-17.

Mohawkian (Rysedorph): Rysedorph Hill, Rennselaer County, New York.

Euryphilina dianthus Ruedemann.

Euryphilina dianthus Ruedemann, *Bull. New York State Mus.*, 49, 1901, p. 78, pl. 5, figs. 1, 2, 8, 9.

Mohawkian (Rysedorph): Rysedorph Hill, Rennselaer County, New York.

Euryphilina frobisheri (Emerson).

Primitia frobisheri Emerson, *Narrative Hall's Sec. Arctic Exped.*, U. S. Navy Dep., 1879, p. 581, fig. 8.

Richmond: Frobisher Bay, Baffin Land.

Plastotype.—Cat. No. 60728, U.S.N.M.

Eurychillina granosa Ulrich.

Eurychilina granosa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1890, p. 128, pl. 9, figs. 9-12.

Stones River (Ridley?): Bottom of gorge at High Bridge, Kentucky.

Cotypes.—Cat. No. 41616, U.S.N.M.

Eurychillina jerseyensis Weller.

Eurychilina jerseyensis Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 210, pl. 13, fig. 17.

Trenton: Near Iliffs Pond, New Jersey.

Eurychillina latimarginata (Raymond).

Primitia latimarginata Raymond, Amer. Jour. Sci., 20, 1905, p. 380.

Eurychilina latimarginata Raymond, Ann. Carnegie Mus., 7, No. 2, 1911, p. 255, fig. 26.

Chazy: Chazy, Valcour Island, Crown Point, etc., New York (Day Point, Valcour); East Tennessee (Lenoir).

Eurychillina longula Ulrich.

Eurychilina longula Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1890, p. 127, pl. 9, figs. 3a, b, 4.

Black River (Lowville): High Bridge, Kentucky.

Cotypes.—Cat. No. 41623, U.S.N.M.

Eurychillina manitobensis Ulrich.

Eurychilina manitobensis Ulrich, Geol. Surv. Canada, Cont. Micro-Pal., pt. 2, 1889, p. 53, pl. 9, figs. 10, 10a.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 127 (loc. occ.)

Richmond (Stony Mountain): Stony Mountain, Manitoba; Wyoming.

Eurychillina obesa Ulrich.

Eurychilina obesa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1890, p. 129, pl. 9, fig. 13.

Black River (Lowville): High Bridge, Kentucky.

Holotype.—Cat. No. 41624, U.S.N.M.

Eurychillina obliqua Ruedemann.

Eurychilina obliqua Ruedemann, Bull. New York State Mus., 49, 1901, p. 79, pl. 5, figs. 10-12.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

Eurychillina oculifera Weller.

Eurychilina oculifera Weller, Geol. Surv. New Jersey, 3, 1903, p. 210, pl. 13, fig. 16.

Trenton: Near Iliffs Pond, New Jersey.

Eurychillina reticulata Ulrich.

Eurychilina reticulata Ulrich, Cont. Micro-Pal., Geol. Surv. Canada, pt. 2, 1889, p. 52, pl. 9, figs. 9, 9a; Geol. Minnesota, 3, pt. 2, 1894, p. 660, pl. 44, fig. 1.—Ruedemann, Bull. New York State Mus., 49, 1901, p. 76, pl. 5, fig. 3.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 298, fig. 46.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 348, fig. 1657p.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 738, fig. 1425g.

Mohawkian: Minneapolis, St. Paul, etc., Minnesota (Black River-Decorah); Rysedorph Hill, New York (Rysedorph).

Cotypes and pleiotypes.—Cat. Nos. 44600, 44601, U.S.N.M.

Eurychilina reticulata incurva Ulrich.

Eurychilina reticulata incurva Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 661, pl. 44, fig. 2.

Black River (Decorah): St. Paul, Minnesota.

Holotype.—Cat. No. 41599, U.S.N.M.

Eurychilina? solida Ruedemann.

Eurychilina? solida Ruedemann, Bull. New York State Mus., 49, 1901, p. 77, pl. 5, fig. 18.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

Eurychilina? striatmarginata (Miller).

Beyrichia striato-marginatus Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 233, fig. 26; N. A. Geol. Pal., 1889, p. 535, fig. 979.

Eurychilina striatmarginata Ulrich, Cont. Micro-Pal., Geol. Surv. Canada, pt. 2, 1889, p. 52; Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1890, p. 130, pl. 9, fig. 14; Geol. Minnesota, 3, pt. 2, 1894, p. 659.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1046, pl. 13, fig. 9.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 348, fig. 1657t.

Richmond (Whitewater-Saluda): Osgood, etc., Indiana.

Plesiotype.—Cat. No. 41615, U.S.N.M.

Eurychilina? subaequata Ulrich.

Eurychilina? subaequata Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 663, pl. 45, figs. 7-9.

Black River (Decorah): St. Paul, Minnesota.

Holotype.—Cat. No. 41628, U.S.N.M.

Eurychilina subradiata Ulrich.

Eurychilina subradiata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1890, p. 126, pl. 9, figs. 1a-c, 2a-c; Geol. Minnesota, 3, pt. 2, 1894, p. 661, pl. 4, figs. 3, 4, 4a.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 299, fig. 49.—Ruedemann, Bull. New York State Mus., 162, 1912, pl. 9, fig. 16.

Stones River: Lebanon, Tennessee.

Black River: Dixon, Illinois, etc. (Platteville); Minneapolis, Minnesota (Decorah).

Trenton (Canajoharie): Canajoharie, New York.

Cotypes and *plesiotypes*.—Cat. Nos. 41611, 41613, 41614, U.S.N.M.

Eurychilina subradiata rensselaerica Ruedemann.

Eurychilina subradiata rensselaerica Ruedemann, Bull. New York State Mus., 49, 1901, p. 77, pl. 5, figs. 4-7, 13.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

Eurychilina symmetrica Ulrich.

Eurychilina symmetrica Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 663, pl. 44, figs. 5-7; pl. 45, figs. 4-6.

Black River (Decorah): St. Paul and near Cannon Falls, Minnesota.

Cotypes.—Cat. No. 41386, U.S.N.M.

Eurychilina ventrosa Ulrich.

Eurychilina ventrosa Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 662, pl. 45, figs. 1-3.

Trenton (Prosser): Near Cannon Falls and Kenyon, Minnesota.

Cotype.—Cat. No. 41625, U.S.N.M.

EURYDICTYA Ulrich.Genotype: *E. montifera* Ulrich.

Eurydicta Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 389, 520.—(Ulrich in press), Miller, N. A. Geol. Pal., 1889, p. 301.—Ulrich, Geol. Minnesota, 3, 1893, p. 138.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 17.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 527.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 48.

***Eurydictya calhounensis* Ulrich.**

Eurydictya calhounensis Ulrich, Geol. Surv. Illinois, 8, 1890, p. 520, pl. 30, figs. 4-4c.

Black River (Kimmswick): Three miles north of Cap au Gres, Calhoun County, Illinois.

Sections of *holotype*.—Cat. No. 43754, U.S.N.M.

***Eurydictya montifera* Ulrich.**

Eurydictya montifera Ulrich, Geol. Surv. Illinois, 8, 1890, p. 521, pl. 30, figs. 3-3d.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, figs. 80-82 (p. 528).

Richmond (Fernvale): Wilmington, Illinois.

Fragment of *holotype*.—Cat. No. 43753, U.S.N.M.

***Eurydictya multipora* (Hall).**

Phenopora multipora Hall, Foster and Whitney's Rep. Geol. Lake Superior Land District, pt. 2, 1851, p. 206, pl. 24, figs. 1a, b.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 171, pl. 8, figs. 7-7b.

Eurydictya multipora Ulrich, Geol. Surv. Illinois, 8, 1890, p. 520; Geol. Minnesota, 3, 1893, p. 139, pl. 6, 9-11; pl. 14, 9-11 (not pl. 7, 24, 29-31=*Rhinidictya fidelis* Ulrich).—Nickles and Bassler, U. S. Geol. Surv., 173, 1900, p. 241.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 38, pl. 1, figs. 11, 12.

Ptilodictya antiqua James, Paleontologist, 5, 1881, p. 37.

Black River and Trenton: Escanaba River, Michigan; Burgin, Kentucky; Nashville, Tennessee; St. Paul, Minnesota.

Plesiotypes.—Cat. No. 43604, U.S.N.M.

EURYDICTYA MULTIPORA (in part) Ulrich. See *Rhinidictya fidelis*.

***Eurydictya sterlingensis* Ulrich.**

Eurydictya sterlingensis Ulrich, Geol. Surv. Illinois, 8, 1890, p. 522, pl. 30, figs. 2, 2a.

Richmond (Maquoketa): Sterling and South Elgin, Illinois.

EURYMMA Ulrich.Genotype: *Modiolopsis plana* Hall.

Eurymma Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 512.—Sardeson, Amer. Geol., 30, 1902, p. 39.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 517.

***Eurymma alata* (Ulrich).**

Modiolopsis alata Ulrich, Amer. Geol., 5, 5, 1890, p. 280, figs. 8a-c.

Eurymma alata Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 512 (gen. ref.).

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

Cotypes.—Cat. No. 46201, U.S.N.M.

***Eurymma plana* (Hall).**

Modiolopsis plana Hall, Rep. Supt. Geol. Surv. Wisconsin, 1861, p. 30; Geol. Wisconsin, 1, 1862, pp. 38 and 438, fig. 6.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 156, fig.—Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1892, p. 224, fig.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 56, pl. 7, figs. 12, 13 (714, 15).—Sardeson, Amer. Geol., 30, 1902, p. 40, figs. 1-9.

Eurymya plana—Continued.

- Eurymya plana* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 512, pl. 36, figs. 27, 28.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 518, figs. 696a, b.
Black River (Platteville): Beloit, Janesville, Mineral Point, etc., Wisconsin; Minneapolis, St. Paul, etc., Minnesota.
Pteriotypes.—Cat. No. 46202, U.S.N.M.

Eurymya subplana Ulrich.

- Eurymya subplana* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 513.
Trenton (Hermitage): Central Tennessee and Mercer County, Kentucky.
Cotypes.—Cat. No. 46203, U.S.N.M.

EURYMYA? TRUNCATA Ulrich. See *Modiolodon truncata*.**EURYMYELLA** Williams.Genotype: *E. shaleri* Williams.

- Eurymyella* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 382.

Eurymyella angularis Williams.

- Eurymyella angularis* Williams, Proc. U. S. Nat. Mus., 1912, p. 387, pl. 49, figs. 10, 11.
Silurian (Eastport): East side Seward Neck, Washington County, Maine.
Holotype and *paratype*.—Cat. No. 58437, U.S.N.M.

Eurymyella convexa Williams.

- Eurymyella convexa* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 389, pl. 50, fig. 10.
Silurian (Eastport): Salt works, Eastport, Maine.
Holotype.—Cat. No. 58448, U.S.N.M.

Eurymyella denbowensis Williams.

- Eurymyella denbowensis* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 390, pl. 50, figs. 11–14.
Silurian (Pembroke): Denbow Point, Washington County, Maine.
Holotype and *paratype*.—Cat. No. 58449, U.S.N.M.

Eurymyella plana Williams.

- Eurymyella plana* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 388, pl. 49, fig. 14.
Silurian (Eastport): East side of Seward Neck, Washington County, Maine.
Holotype.—Cat. No. 58439, U.S.N.M.

Eurymyella recta Williams.

- Eurymyella recta* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 389, pl. 49, fig. 15.
Silurian (Eastport): East side of Seward Neck, Washington County, Maine.
Holotype.—Cat. No. 58440, U.S.N.M.

Eurymyella shaleri Williams.

- Eurymyella shaleri* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 385, pl. 49, figs. 1–4.
Silurian (Eastport): Moose Island, etc., Washington County, Maine.
Cotypes.—Cat. Nos. 58431–58433, U.S.N.M.

Eurymyella shaleri breva Williams.

- Eurymyella shaleri* var. *breva* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 386, pl. 49, figs. 5–7.
Silurian (Eastport): Moose Island, etc., Washington County, Maine.
Cotypes.—Cat. No. 58434, U.S.N.M.

Eurymyella shaleri longa Williams.

Eurymyella shaleri var. *longa* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 337, pl. 49, fig. 8.

Silurian (Eastport): Moose Island, etc., Washington County, Maine.

Holotype.—Cat. No. 58435, U.S.N.M.

Eurymyella shaleri minor Williams.

Eurymyella shaleri var. *minor* Williams, Proc. U. S. Nat. Mus., 42, 1912, p. 337, pl. 49, fig. 9; *ibid.*, 45, 1913, p. 346, pl. 31, fig. 5.

Silurian (Eastport): Sipps Bay, south of highway bridge, Washington County, Maine.

Holotype and *paratype*.—Cat. Nos. 58436, 58972, U.S.N.M.

Eurymyella? simulans Williams.

Eurymyella? simulans Williams, Proc. U. S. Nat. Mus., 1912, p. 388, pl. 49, figs. 12, 13.

Silurian (Eastport): East side of Seward Neck, Washington County, Maine.

Cotypes.—Cat. No. 58438, U.S.N.M.

EURYPTERUS DeKay.

Genotype: *E. remipes* DeKay.

Eurypterus DeKay, Annals Lyceum Pal. New York, 1, 1825, p. 375.—Harris, Medical, Physical Res., 1835, p. 297.—Hibbert, Trans. Royal Soc. Edinburgh, 13, 1836, p. 281.—Conrad, 1st Ann. Rep. New York Geol. Surv., 1837, p. 182.—Fischer de Waldheim, Bull. Soc. geol. France, 11, 1840, p. 368.—Edwards, Hist. Nat. d. Crustaces, 3, 1840, p. 422.—Conrad, 5th Ann. Rep. New York Geol. Surv., 1841, p. 38.—Roemer, Palaeontographica, 1, 1844, pp. 192–193.—McCoy, British Pal. Rocks Fossils, 1854, p. 175.—Pictet, Traité de Pal., 2d ed., 2, 1854, p. 529.—Salter, Quart. Jour. Geol. Soc. London, 12, 1856, p. 27.—Nieszkowski, Archiv. f. Naturk. Liv.-Ebst-u. Kul., 1858, 2, p. 308.—Hall, Pal. New York, 3, 1859, 1861, pp. 382; 385; 392; 395; 397, figs. 1, 2; 398, fig. 3; 400, fig. 5; 403, figs. 6, 7.—Woodward, Mon. British Foss. Crust., Pal. Soc., 1872, p. 132.—Barrande, Syst. Sil. du Centre Bohême, 1, Suppl., 1872, p. 563.—Alth, Abhandl. der K.-K. Geol. Reichsanstalt, 7, Heft 1, 1874, p. 54.—Hall and Clarke, Pal. New York, 7, 1888, p. 49.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg., 7 ser., 31, 5, 1883, p. 48.—Zittel, Handb. Pal., 2, 1885, p. 647.—Miller, N. A. Geol. Pal., 1889, p. 548.—Vogdes, Annals New York Acad. Sci., 1889, p. 20, pl. 1, fig. 7.—Laurie, Trans. Royal Soc. Edinburgh, 37, 1893, p. 517; Nat. Sci., 2, 1893, p. 125; *ibid.*, 3, 1893, p. 125.—Clarke, Zittel-Eastman Textb. Pal. 1, 1900, p. 674.—Grabau, Bull. New York State Mus., 45, 1901, p. 228.—Clarke, 54th Rep. New York State Mus., 1901, p. 83.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 228.—Clarke, Bull. New York State Mus., 107, 1907, p. 304.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 405.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 155.—Clarke, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 782.

Onychopterus (subgenus of *Eurypterus*) Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 212.—Clarke, Zittel-Eastman Textb. Pal., 1913, p. 782. (Genotype: *Eurypterus kokomoensis* Miller and Gurley).

Tylopterus (subgenus of *Eurypterus*) Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 216.—Clarke, Zittel-Eastman Textb. Pal., 1913, p. 783. (Genotype: *Eurypterus boylei* Whiteaves).

Eurypterus (Tylopterus) boylei (Whiteaves).

Eurypterus Boylei Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 42, pl. 7, fig. 3; *ibid.*, pt. 2, 1895, p. 109 (loc. occ.)

Eurypterus (Tylopterus) boylei—Continued.

Tylopterus boylei Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 218, fig. 42.

Niagaran (Guelph): Elora, Ontario.

EURYPTERUS? CESTROTUS Clarke. See *Stylonurus* (*Ctenopterus*) *cestrotus*.

Eurypterus chadwicki Clarke and Ruedemann.

Eurypterus chadwicki Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 413, fig. 95.

Chazyan (Normankill): Catskill, New York.

EURYPTERUS CICEEROPS Clarke. See *Eusarcus* (?) *cicerops*.

EURYPTERUS? CLEVELANDI Walcott. See *Echinognathus clevelandi*.

Eurypterus dekayi Hall.

Eurypterus dekayi Hall, Pal. New York, 3, 1859, p. 411, pl. 82, fig. 1.—Grabau, Bull. New York State Mus., 45, 1901, p. 230; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 230.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 409.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 181, pl. 19, fig. 2; pl. 20, fig. 1.

Cayugan (Bertie): Buffalo, New York.

EURYPTERUS ERIENSIS Whitfield. See *Eurypterus microphthalmus*.

EURYPTERUS GIGANTEUS Pohlman. See *Eurypterus pustulosus*.

Eurypterus (Onychopterus) kokomoensis (Miller and Gurley).

Eurypterus kokomoensis Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 10, 1896, p. 90, pl. 5, fig. 1.

Eurypterus (Onychopterus) kokomoensis Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 212, pl. 25, figs. 1, 2; pl. 26, fig. 2.

Cayugan (Kokomo): Kokomo, Indiana.

Eurypterus lacustris Harlan.

Eurypterus lacustris Harlan, Trans. Geol. Soc. Pennsylvania, 1, 1834, p. 98, pl. 5, fig. 2; Medical, Physical Res., 1835, p. 298, pl. 5, fig. 2.—Hibbert, Trans. Royal Soc. Edinburgh, 13, 1836, p. 281, pl. 12, fig. 6.—Edwards, Hist. Nat. d. Crustacées, 3, 1840, p. 422.—Fischer de Waldheim, Bull. Soc. Geol. France, 11, 1840, p. 368.—Hall, Pal. New York, 3, 1859, p. 400, text fig. 5; p. 407, pl. 81, figs. 1-11; pl. 81A, fig. 1; pl. 81B, figs. 1-5; pl. 83B, fig. 3.—Grabau, Bull. New York State Mus., 45, 1901, p. 229; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 229.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 408, fig. 1708.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 173, pls. 9-12; pl. 13, fig. 3; figs. 35, 36.

Eurypterus robustus Hall, Pal. New York, 3, 1859, p. 410, pl. 81C, fig. 1; also see corrigenda, p. 533.—Grabau, Bull. New York State Mus., 45, 1901, p. 229; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 229.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 408, fig. 1710.

Eurypterus remipes Bronn and Roemer, Leth., 3d ed., 2, 1854, p. 666, pl. 9, fig. 1. Cayugan (Bertie): Williamsville, Buffalo, Black Rock, Erie County, and Union Springs, Cayuga County, New York; Bertie, Ontario.

Eurypterus lacustris pachycheirus (Hall).

Eurypterus pachycheirus Hall, Pal. New York, 3, 1859, p. 412, pl. 82, figs. 1-3.—Pohlman, Bull. Buffalo Soc. Nat. Sci., 4, 1881, p. 19, fig. 7.—Grabau, Bull. New York State Mus., 45, 1901, p. 230; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 230.

Eurypterus lacustris pachycheirus—Continued.

Eurypterus lacustris var. *pachycheirus* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 179, pl. 12, fig. 3; pl. 19, fig. 1.

Cayugan (Bertie): Buffalo and Black Rock, New York.

Eurypterus maria Clarke.

Eurypterus maria Clarke (part) Bull. New York State Mus., 107, 1907, p. 305, pl. 1, figs. 1, 2, 4; pl. 2, figs. 2, 4, 7; pl. 3, figs. 1-5, 7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 406, figs. 1705a-c, 1713d-e.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 184, pls. 21, 22, fig. F. Medinan (Shawangunk): Otisville, New York, and Delaware Water Gap, Pennsylvania.

EURYPTERUS MARIA (part) Clarke. See *Pterygotus* (*Erettopterus*) *globiceps* and *Stylonurus myops*.

Eurypterus megalops Clarke and Ruedemann.

Eurypterus megalops Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 191, pl. 83, fig. 7.

Trenton (Schenectady): Near Rotterdam Junction, Schenectady County, New York.

Eurypterus microphthalmus Hall.

Eurypterus microphthalmus Hall, Pal. New York, 3, 1859, p. 407, pl. 80A, fig. 7.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 192, pl. 20, figs. 2-10.

Eurypterus Eriensis Whitfield, Annals New York Acad. Sci., 2, 1882, p. 194.—Claypole, Proc. Amer. Phil. Soc., 21, 1883, p. 239.—Whitfield, Geol. Surv. Ohio, Pal., 7, 1893, p. 416, pl. 1, figs. 31, 32; Ann. New York Acad. Sci., 5, 1891, p. 515, pl. 5, figs. 31, 32.—Grabau and Shimer, N. A. Index Fossils, 1, 1910, p. 407, fig. 1707.—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1908, p. 208, pl. 30, figs. 31-32.

Cayugan: Drift boulder near Cazenovia; also Onondaga, Litchfield, Cherry Valley, and Manlius village, New York (top of Manlius); Put-in-Bay, Lake Erie (Put-in-Bay).

EURYPTERUS MYOPS Clarke. See *Stylonurus myops*.

EURYPTERUS PACHYCHEIRUS Hall. See *Eurypterus lacustris pachycheirus*.

Eurypterus pittsfordensis Sarle.

Eurypterus pittsfordensis Sarle, Bull. New York State Mus., 69, 1902, p. 1098, pl. 10, fig. 7; pl. 15, figs. 1-3; pls. 16-23; pl. 24, figs. 2-5; pl. 25, figs. 2, 5, 6.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 407, fig. 1706.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 196, pl. 13, figs. 4-6; pls. 14-16; pl. 17, figs. 1-6; pl. 18, figs. 3-8.

Cayugan (Pittsford): Pittsford, Monroe County, New York.

Eurypterus pristinus Clarke and Ruedemann.

Eurypterus pristinus Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 207, pl. 83, figs. 5, 6.

Trenton (Schenectady): Dettbarn quarry, Schenectady, New York.

Eurypterus? (*Dolichopterus?*) *prominens* Hall.

Eurypterus prominens Hall, Proc. Amer. Assoc. Adv. Sci., 33, 1884, p. 420.—Hall and Clarke, Pal. New York, 7, 1888, p. 157, pl. 27, figs. 3, 4.

Eurypterus? (*Dolichopterus?*) *prominens* Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 200, fig. 38.

Clinton sandstone: Northern part of Cayuga County, New York.

Eurypterus pustulosus Hall.

Eurypterus pustulosus Hall, Pal. New York, 3, 1859, p. 413, pl. 83B, fig. 1.—Grabau, Bull. New York State Mus., 45, 1901, p. 229; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 229.—Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 201, pls. 23, 24, figs. 39–41.

Eurypterus giganteus Pohlman, Bull. Buffalo Soc. Nat. Sci., 4, 1883, p. 41, pl. 2, fig. 1.

Pterygotus globicaudatus Pohlman, Bull. Buffalo Soc. Nat. Sci., 4, 1883, p. 42, pl. 2, fig. 2.—Laurie, Trans. Royal Soc. Edinburgh, 37, 1893, p. 515.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 231; Bull. New York State Mus., 45, 1901, p. 231.

Cayugan (Bertie): Buffalo, New York.

Pteriotype.—Cat. No. 60051, U.S.N.M.

Eurypterus ranllarva Clarke and Ruedemann.

Eurypterus ranllarva Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 208, pl. 17, fig. 7; pl. 18, figs. 1, 2.

Cayugan (Kokomo): Kokomo, Indiana.

Eurypterus remipes Dekay.

Eurypterus remipes Dekay, Annals Lyceum Nat. Hist. New York, 1, 1825, p. 375, pl. 29; *ibid.*, 2, 1828, p. 273.—Harlan, Trans. Geol. Soc. Pennsylvania, 1, 1832, p. 96, pl. 5, fig. 1; Amer. Mo. Mag., 3, 1834, p. 291; Medical, Physical Res., 1835, p. 297, fig. 1.—Bronn, Leth. Geol., 1, 1835–1837, p. 109, fig. 1.—Hibbert, Trans. Roy. Soc. Edinburgh, 13, 1836, pl. 12, fig. 7, p. 281.—Edwards, Hist. Nat. d. Crustacees, 3, 1840, p. 422.—Fischer de Waldheim, Bull. Soc. Geol. France, 11, 1840, p. 368.—Vanuxem, Nat. Hist. New York, Geol., 3, 1842, pp. 99, 100, fig.—Roemer, Palaeontographica, 1, 1848, p. 190, pl. 27.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 529, pl. 46, fig. 14.—Hall, Pal. New York, 3, 1859, p. 382; p. 403, figs. 6, 7; p. 404, pl. 80, figs. 1–12; pl. 80A, figs. 1–6; 11–17; pl. 83B, fig. 2; pl. 84A, figs. 1, 2.—Emmons, Man. Geol., 1860, p. 41, fig. 34; p. 122, fig. 4.—Chapman, Canadian Jour., n. s., 8, 1863, p. 440, fig. 227; Expos. Min. Geol. Canada, 1864, p. 191, fig. 227.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, pp. 958, 959, figs. 463a, b, 464.—Woodward, Quart. Jour. Geol. Soc. London, 23, 1867, pl. 1, fig. 7.—Meek and Worthen, Amer. Jour. Sci. Arts, 2d ser., 46, 1868, footnote p. 20, p. 546.—Woodward, Mon. British Foss. Crust., Palaeontographical Soc., 1872, p. 132, fig. 40.—Walcott, Bull. Mus. Comp. Zool., 8, 1881, pl. 5, fig. 7.—Peach, Proc. Royal Soc. Edinburgh, 9, 1888, pl. 20, figs. 2, 2a.—Miller, N. A. Geol. Pal., 1889, p. 548, fig. 1008.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 236, fig.—Clarke, Zittel-Eastman Textb. Pal., 1900, 1, pt. 2, p. 676, figs. 1420, 1421.—Grabau, Bull. New York State Mus., 45, 1901, p. 229, pl. 18; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 229, pl. 18.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 408, fig. 1709, Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 161, pls. 2–8, figs. 33, 34.

Cayugan: Waterville, Litchfield, Seneca Falls, North Buffalo, etc. (Bertie), and Seneca Falls (Rondout), New York.

EURYPTERUS REMIPES Bronn and Roemer. See *Eurypterus lacustris*.

EURYPTERUS ROBUSTUS Grabau. See *Eurypterus lacustris*.

Eurypterus? (Dolichopterus?) stellatus Clarke and Ruedemann.

Eurypterus? (Dolichopterus?) stellatus Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 211, pl. 83, figs. 1–4.

Trenton (Schenectady): Schenectady, New York.

EURYSOMA Claypole. See *Eusarcus* Grote and Pitt.

EURYSTOMITES Schröder.

Genotype: *Nautilus kelloggi* Whitfield

Eurystomites Schröder, Pal. Abhandl. von Dames u. Kayser, Neue Folge, 1, Heft 4, Jena, 1891, p. 26.—Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 441.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 773.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 811.—Ruedemann, Bull. New York State Mus., 90, Pal., 14, 1906, pp. 451, 456.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 68.

Eurystomites accelerans Ruedemann.

Eurystomites accelerans Ruedemann, Bull. New York State Mus., 90, 1906, p. 461, pl. 18, figs. 2, 3; fig. 23.

Canadian (Beekmantown): Valcour, New York.

Eurystomites amplexans Ruedemann.

Eurystomites amplexans Ruedemann, Bull. New York State Mus., 90, 1906, p. 461, pl. 18, figs. 4-7; fig. 24.

Canadian (Beekmantown): Valcour, New York.

Eurystomites apollo (Billings).

Lituities Apollo Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 25 (adv. sheets 1862).

Eurystomites apollo Miller, N. A. Geol. Pal., 2d App., 1897, p. 773 (gen. ref.).

Canadian (Romaine): Mingan Islands, Canada.

EURYSTOMITES CHAMPLAINENSIS Schröder. See *Tarphyceras champlainense*.

Eurystomites gibbosus Hyatt.

Eurystomites gibbosus Hyatt, Proc. Amer. Phil. Soc., 32, 1894, p. 443.

Canadian (Quebec): Port aux Choix, Schooner Island, Newfoundland.

Eurystomites imperator (Billings).

Lituities imperator Billings, Geol. Vermont, 2, for 1861, 1862, p. 957; Rep. Econ. Geol., etc., Vermont, 1862, p. 229; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 23 (adv. sheets 1861).

Eurystomites imperator Miller, N. A. Geol. Pal., 2d App., 1897, p. 773 (gen. ref.).

Canadian (Beekmantown): Phillipsburg, Quebec.

Eurystomites kelloggi (Whitfield).

Nautilus kelloggi Whitfield (part), Bull. Amer. Mus. Nat. Hist., 1, 1886, 8, p. 323, pl. 30, fig. 1 (not pl. 31, figs. 4, 5—*E. rotundus* Hyatt).

Eurystomites kelloggi Schröder, Pal. Abh. herausg. von Dames und Kayser, 1, Heft 4, 1891, p. 27.—Hyatt, Amer. Phil. Soc. Proc., 32, 1894, p. 442, pl. 3, figs. 4, 5; figs. 21, 22.—Ruedemann, Bull. New York State Mus., 90, 1906, pp. 451, 456, figs. 21, 22; pl. 17, fig. 1; pl. 18, fig. 1.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 69, fig. 1278.

Canadian: Fort Cassin, Vermont; Valcour, New York (Beekmantown); Pickett Station, Wisconsin (Shakopee).

Plesiotype.—Cat. No. 25647, U.S.N.M.

Eurystomites plicatus Whiteaves.

Eurystomites plicatus Whiteaves, Canadian Rec. Sci., 6, 1895, p. 396; Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 225, figs. 15, 16; pl. 22, fig. 2.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 173.

Black River or Richmond: Little Black Island, Lake Winnipeg, and Baffin Land, Canada.

Eurystomites robertsoni (Hall).

Lituites robertsoni Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 38.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 64, pl. 10, figs. 4-6.

Eurystomites robertsoni Miller, N. A. Geol. Pal., 2d App., 1897, p. 773 (gen. ref.). Black River (Platteville): Beloit, Wisconsin; Rockford, Illinois.

Eurystomites rotundus Hyatt.

Nautilus kelloggi Whitfield (part), Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 328, pl. 31, figs. 4, 5.—Seely, Vermont State Geol. Rep., 7, 1910, pl. 53, figs. 4, 5.

Eurystomites rotundus Hyatt, Amer. Phil. Soc. Proc., 32, 1894, p. 443, pl. 5, figs. 21-25.—Ruedemann, Bull. New York State Mus., 90 1906, p. 463.

Canadian (Beekmantown): Fort Cassin, Vermont.

Colotypes.—Cat. No. 25655, U.S.N.M.

EURYSTOMITES UNDATUS Hyatt. See *Plectoceras? undatum*.

EURYSTOMITES UNDATUS var. **OCCIDENTALIS** Clarke. See *Plectoceras undatum occidentale*.

Eurystomites virginianus Hyatt.

Eurystomites virginiana Hyatt, Amer. Phil. Soc. Proc., 32, 1894, p. 444.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 463.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 69.

Canadian (Beekmantown): Near Lexington, Virginia; Fort Cassin, Vermont.

Holotype.—Cat. No. 9611, U.S.N.M.

EUSARCUS Grote and Pitt.

Genotype: *E. scorpionis* Grote and Pitt.

Eusarcus Grote and Pitt, Bull. Buffalo Soc. Nat. Sci., 3, 1875, pp. 1, 2.—Pohlman, Bull. Buffalo Soc. Nat. Sci., 5, 1886, p. 29.—Claypole, Amer. Geol., 13, 1894, p. 78, footnote.—Clarke, Zittel-Eastman Textb. Pal., 1, 1900, p. 676; *ibid.*, 2d ed., 1913, p. 783.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 230; Bull. New York State Mus., 45, p. 230.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 409.—Clarke and Ruedemann, Mem. New York State Mus. 14, 1912, p. 228.

Eurysoma Claypole, Amer. Geol., 6, p. 258. (Genotype, *E. newlini* Claypole.)

Carcinosoma (*Eurysoma* preoccupied) Claypole, Amer. Geol., 13, 1894, p. 78.—Miller, N. A. Geol. Pal., 1st App. 1892, p. 706.

Eusarcus(?) cicerops (Clarke).

Eurypterus? cicerops Clarke, Bull. New York State Mus., 107, 1907, p. 307, pl. 5, fig. 10; pl. 5, fig. 7.

Eusarcus(?) cicerops Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 253, pl. 36, figs. 2-10.

Medinan (Shawangunk): Otisville, New York.

EUSARCUS GRANDIS Grote and Pitt. See *Eusarcus scorpionis*.

Eusarcus lingulatus Clarke and Ruedemann.

Eusarcus lingulatus Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 413, figs. 96, 97.

Chazyan (Normanskill): Catskill, New York.

Eusarcus longiceps Clarke and Ruedemann.

Eusarcus longiceps Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 257, pl. 84, figs. 1-6.

Trenton (Schenectady): Schenectady, New York.

Eusarcus newlini (Claypole).

Eurysona newlini Claypole, Amer. Geol., 6, 1890, pp. 258, 260, fig. 3.

Carcinosoma newlini Claypole, Amer. Geol., 6, 1890, p. 400; *ibid.*, 13, 1894, p. 78.

Eusarcus newlini Clarke and Ruedemann, Mem. New York State Mus., 14, 1912, p. 245, pl. 36, fig. 11; pls. 37-39, figs. 59, 60.

Carcinosoma ingens Claypole, Amer. Geol., 13, 1894, p. 77, pl. 4.

Cayugan (Kokomo): Kokomo, Indiana.

Plesiotype.—Cat. No. 42559, U.S.N.M.

Eusarcus scorpionis Grote and Pitt.

Eusarcus scorpionis Grote and Pitt, Bull. Buffalo Soc. Nat. Sci., 3, 1875, p. 1.—

Pohlman, *ibid.*, 4, 1881, p. 21.—Grabau, Bull. New York State Mus., 45,

1901, p. 231; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 231.—Grabau and Shimer,

N. A. Index Fossils, 2, 1910, p. 410.—Clarke and Ruedemann, Mem. New York

State Mus., 14, 1912, p. 233, pls. 27-34; pl. 35, figs. 2-5; pl. 36, fig. 1; figs. 54-58.

Eusarcus grandis Grote and Pitt, Bull. Buffalo Soc. Nat. Sci., 3, 1875, p. 17.—

Pohlman, *ibid.*, 5, 1886, p. 31.—Grabau, Bull. New York State Mus., 45,

1901, p. 230; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 230.—Grabau and

Shimer, N. A. Index Fossils, 2, 1910, p. 410.

Cayugan (Bertie): Williamsville and Buffalo, New York.

EUSARCUS SCORPIONIS Pohlman. See *Dolichopterus siluriceps*.

Eusarcus triangulatus Clarke and Ruedemann.

Eusarcus triangulatus Clarke and Ruedemann, Mem. New York State Mus., 14,

1912, p. 258, pl. 84, figs. 7-9.

Trenton (Schenectady): Schenectady, Duaneburg, and Rotterdam Junction, New York.

Eusarcus vaningeni Clarke and Ruedemann.

Eusarcus vaningeni Clarke and Ruedemann, Mem. New York State Mus., 14,

1912, p. 420, figs. 108-115.

Cuyagan (Pittsford): Oriskany Creek, near Clinton, New York.

EUSPIROCRINUS Angelin.

Genotype: *E. spiralis* Angelin.

Euspirocrinus Angelin, Icon. Crin. Suec., 24, 1878.—Wachsmuth and Springer,

Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 366 (Rev. Pal., pt. 1, p. 143);

ibid., 1886, pp. 112, 143 (Rev. Pal., pt. 3, sec. 2, pp. 188, 219).—Bather,

Treatise on Zool. (Lankester), pt. 3, 1900, p. 173.—Wachsmuth, Zittel-East-

man Textb. Pal., 1, 1900, p. 157.—Springer, *ibid.*, 2d ed., 1913, p. 218.—

Zittel, Grundzuge Pal., 1, 1910, pp. 135, 154.

Euspirocrinus obconicus W. R. Billings.

Euspirocrinus obconicus W. R. Billings, Trans. Ottawa Field Nat. Club, 2, 1885,

p. 248, pl. fig.—Miller, N. A. Geol. Pal., 1889, p. 246, figs. 306, 307.

Trenton: Ottawa, Ontario; Hull, Quebec.

EUTHYRIS Quenstedt. See *Athyris* McCoy.**FABERIA** Miller.

Genotype: *F. anomala* Miller.

Faberia Miller, N. A. Geol. Pal., 1889, p. 549.

Faberia anomala Miller.

Faberia anomala Miller, N. A. Geol. Pal., 1889, p. 549, fig. 1009.

Maysville or Richmond: Butler County, Ohio.

AVASTRÆA STRIATA D'Orbigny. See *Strombodes striatus*.

VISTELLA Dana. See *Columnaria* Goldfuss.

FAVISTELLA FAVOSIDEA Hall. See *Favosites favosidea*.

Favistella? franklini Salter.

Favistella Franklini Salter, Sutherland's Jour. Voyage in Baffins Bay, etc., 2, 1852, p. 229, pl. 6, figs. 3, 3a.—Haughton, Jour. Geol. Soc. Dublin, 1, 1859, p. 247, pl. 11, fig. 1.—Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 586. Silurian: Cape Riley, Dobbin Bay, and Cape Hilgard, Arctic America.

Favistella? reticulata Salter.

Favistella reticulata Salter, Sutherland's Jour. Voyage in Baffins Bay, etc., 2, App., 1852, p. 229, pl. 6, figs. 2, 2a.—Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 586. Silurian: Cape Riley, Franklin Pierce Bay, and Cape Hilgard, Arctic America.

FAVOSITELLA Etheridge and Foord.

Genotype: *Favosites interpuncta* Quenstedt.

Bythotrypa Ulrich, Geol. Minnesota, 3, 1893, p. 324; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 268.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 24.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 123. (Genotype: *Fistulipora? laxata* Ulrich.)

Favositella Etheridge and Foord, Ann. Mag. Nat. Hist., 5th ser., 13, 1884, p. 472.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 100–102; Zittel-Eastman Textb. Pal., 1913, p. 328.

Favositella epidermata (Ulrich).

Crepidopora epidermata Ulrich, Geol. Surv. Illinois, 8, 1890, p. 471, pl. 40, figs. 1–1e. *Bythotrypa* epidermata Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 186 (gen. ref.). Richmond (Fernvale): Wilmington and Savannah, Illinois; Tennessee. *Cotypes*.—Cat. No. 43229, U.S.N.M.

Favositella laxata (Ulrich).

Fistulipora? laxata Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 37, pl. 8, figs. 2, 2a.

Bythotrypa laxata Ulrich, Geol. Minnesota, 3, 1893, p. 325, pl. 28, figs. 21–25; Zittel's Textb. Pal. (Engl. ed.), 1896, fig. 440 (p. 268).—Whiteaves, Pal. Foss., 3, pt. 3, 1897, p. 163.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 124, fig. 182c.

Favositella laxata Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 101 (gen. ref.); Zittel-Eastman Textb. Pal., 1913, p. 329, fig. 467.

Black River and Trenton: St. Andrews, Manitoba; Minneapolis, St. Paul, Kenyon, Berne, and Cannon Falls, Minnesota; Rockton, Illinois; Decorah, Iowa.

Fragment of *holotype* and *plesiotypes*.—Cat. Nos. 43220, 43241, U.S.N.M.

FAVOSITES Lamarck.

Genotype: *F. alveolatus* Lamarck.

Favosites Lamarck, Cours. de Zool. du Mus. Hist. Nat., Hist. An. Sans Vert., 1812, p. 204.—Eichwald, Zool. Specialis, pt. 1, Vilnae, 1829, p. 193.—Koninck, Desc. Animaux Fossiles, Leige, p. 9.—McCoy, Syn. Char. Carb. Foss. Ireland, 1844, p. 191.—Dana, Wilkes U. S. Expl. Exped., 7, Zoophytes, 1838, p. 430.—Edwards and Haime, Compt. Rend. de l'Acad. Sci., 29, 1849, p. 260; Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, pp. 152, 230.—Hall, Pal. New York, 2, 1852, p. 124.—McCoy, British Pal. Rocks, Fossils, 1854, p. 19.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 440.—Billings, Canadian Jour., n. s., 4, 1859, p. 99.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 246.—Verrill, Amer. Jour. Sci., 3d ser., 3, 1872, p. 191; Ann. Mag. Nat. Hist., 4th ser., 9, 1872, p. 360.—Duncan, Rep. 41st Meeting

FAVOSITES—Continued.

- British Assoc. Adv. Sci., 1872, p. 132.—Koninck, Animaux Foss. Terr. Carb. Belgique, 1872 (Mem. l'Acad. Royale Sci. Belgique), 39, p. 136.—Nicholson, Canadian Jour., n. s., 14, 1873, p. 38.—Salter, Cat. Camb. Sil. Foss., 1873, p. 104.—Nicholson, Geol. Mag., 10, 1873, p. 567; Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 44.—Moseley, Proc. Royal Soc. London, 25, 1875, p. 64.—Nicholson, Geol. Surv. Ohio, Pal., 2, 1875, p. 183.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 19.—Zittel, Handb. Pal., 1, 1879, p. 236.—Nicholson, Tab. Corals Pal. Period, 1879, p. 37.—Thomson, Proc. Phil. Soc. Glasgow, 13, 1881, pp. 201, 202, fig. 1A.; Proc. Phil. Soc. Glasgow, 14, 1883, p. 349; *ibid.*, 20, 1889, p. 121, fig.—Roemer, Leth. Geog., pt. 1, Leth. Pal., 1883, p. 419.—Frech, Zeits. d. Deutschen geol. Gesell., 37, 1885, p. 100.—Hall and Simpson, Pal. New York, 6, 1887, p. 13.—Nicholson, Geol. Mag., dec. 3, 5, 1888, p. 107.—Miller, N. A. Geol. Pal., 1889, p. 188.—Beecher, Trans. Connecticut Acad. Arts Sci., 8, 1891, pp. 209, 210, 215.—Girty, Amer. Geol., 15, 1895, pp. 131-146.—Sarleson, Neues Jahrb. f. Min., Geol., Pal., Beilage-Bd., 10, 1896, pp. 251, 284.—Girty, Amer. Geol., 18, 1896, p. 41.—Say (reprint), Bull. Amer. Pal., 1, 1896, p. 278.—Lambe, Cont. Canadian Pal. Geol. Surv. Canada, 4, pt. 1, 1899, p. 2.—Lindstrom, Kongl. Sven. Vet. Akad. Handl., 32, 1899, p. 49.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 130; Zittel-Eastman Textb. Pal., 1, 1900, p. 99; Bull. New York State Mus., 9, 1901, p. 140; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 140.—Pöckl, Syst. Sil. du Centre Boheme, 8, pt. 2, 1902, p. 213.—Beecher, Amer. Jour. Sci., 16, 1903, p. 9.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 84; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 113.
- Calamopora* Goldfuss, Petrefacta, 1826, pp. 77, 245; 2d ed., pt. 1, 1862, p. 72.
- Emmonsia* Edwards and Haimé, Mon. d. Polyp. Foss. d. Terr. Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), pp. 152-246.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 441.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 257.—Rominger, Jour. Sci. Arts, 2d ser., 34, 1862, p. 391.—Nicholson, Canadian Jour., n. s., 14, 1873, p. 38.—Zittel, Handb. Pal., 1, 1879, p. 237.—Nicholson, Tab. Corals Pal. Period, 1879, p. 41.—Roemer, Leth. Geog., pt. 1, Leth. Pal., 1883, p. 422.—Miller, N. A. Geol. Pal., 1889, p. 187.
- Astrocerium* Hall, Amer. Jour. Sci. Arts, 2d ser., 11, 1851, pp. 399-400; Pal. New York, 2, 1852, p. 120.—Rominger, Amer. Jour. Sci. Arts, 2d ser., 34, 1862, p. 391.—Nicholson, Canadian Jour., n. s., 14, 1873, p. 39; Tab. Corals Pal. Period, 1879, p. 40.

FAVOSITES ALVEOLARIS Lonsdale. See *Paleofavosites asper*.

FAVOSITES ASPERA D'Orbigny. See *Paleofavosites aspera*.

Favosites basalticus nanus Grabau.

Favosites basaltica Goldfuss var. *nana* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 110, pl. 10, figs. 5, 6.

Upper Monroan (Anderdon): Salt shaft, Detroit, Michigan.

FAVOSITES? CAPAX Billings. See *Paleofavosites asper*.

Favosites concavus Grabau.

Favosites concava Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 114, pl. 15, figs. 2, 3.

Upper Monroan (Anderdon): Amherstburg, Ontario.

Favosites constrictus (Hall).

Astrocerium constrictum Hall, Pal. New York, 2, 1852, p. 123, pl. 34A, figs. 2a-c, 3a-e.

Favosites constrictus—Continued.

Favosites constrictus Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 142, fig. 37;

Bull. New York State Mus., 45, 1901, p. 142, fig. 37.

Clinton (Rochester): Lockport, etc., New York; Ontario.

Favosites corrugatus Weller.

Favosites corrugatus Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 220, pl. 17, figs. 1, 2.

Helderbergian (Decker Ferry): Flatbrookville, New Jersey.

Favosites cristatus Edwards and Haime.

Favosites cristatus Edwards and Haime, Pal. Foss. Terr. Paleozoic, 1851, p. 242.—

Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 9, figs. 1-5.

Silurian: Gotland, England, etc.; Indiana, Kentucky, and Tennessee (Osgood and Louisville-Brownsport).

Favosites cristatus major Davis.

Favosites cristatus var. *major* Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 24, fig. 3.

Niagaran: Louisville, Kentucky (Louisville); Perry and Decatur Counties, Tennessee (Brownsport).

Favosites declinatus Foerste.

Favosites declinata Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 300, pl. 2, figs. 4a, b, and pl. 4, fig. 4.

Clinton (Waco): Near Irvine, Panola, Waco, etc., Kentucky.

Favosites discoldeus (Roemer).

Calamopora forbesi var. *discoidea* Roemer, Sil. Fauna West. Tennessee, Breslau, 1860, p. 19, pl. 2, fig. 10a, b; Leth. geog., pt. 1, Leth. Pal., 1883, p. 454.

Favosites forbesi var. *discoidea* Miller, N. A. Geol. Pal., 1889, p. 188 (gen. ref.).

Favosites discoidea Foerste, Jour. Geol., 11, 1903, p. 713.

Niagaran (Brownsport): Perry, Wayne, and Decatur Counties, Tennessee.

Favosites discus Davis.

Favosites discus Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 9, figs. 8, 9.

Niagaran: Louisville, Kentucky (Louisville); West Tennessee (Brownsport).

FAVOSITES EXCRETUS Hall. See *Favosites spinigerus*.**Favosites favosideus** (Hall).

Favistella favosidea Hall, Pal. New York, 2, 1852, p. 41, pl. 17, figs. 2a-f.

Favosites favosideus Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 333.

Clinton: Rochester, Sodus, etc., New York.

Upper Medinan (Brassfield): Dayton, Ohio.

Favosites favosus (Goldfuss).

Calamopora favosa Goldfuss, Petrefacta, 1826, p. 77, pl. 26, fig. 2a-c; *ibid.*, 2d ed., pt. 1, 1862, p. 73.—Troost, 5th Geol. Rep. Tennessee, 1840, p. 70.—Roemer,

Sil. Fauna West. Tennessee, Breslau, 1860, p. 18, pl. 2, fig. 8.—Rominger, Amer. Jour. Sci. Arts, 2d ser., 34, 1862, p. 392.

Favosites favosa Edwards and Haime Mon. d. Polyp. Foss. d. Terr. Pal. 1851 (Arch. du Mus. d'Hist. Nat., 5), p. 233.—Hall, Pal. New York, 2, 1852, p. 126, pl. 34a (bis), fig. 5a-g.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 248.—

Favosites favosus—Continued.

Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 32 (loc. ref.).—Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 147; Geol. Surv. Ohio, Pal. 2, 1875, p. 229; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 52.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 21, pl. 4, figs. 1-4; pl. 5, fig. 2.—White, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 383, pl. 52, figs. 1, 2.—Hall, 12th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 253, pl. 3, figs. 1-4.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 8, figs. 1, 2.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 239, figs.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 333.—Keyes, Missouri Geol. Surv., 4, 1894, p. 120, pl. 14, fig. 2.—Hayes and Ulrich, U. S. Geol. Surv., Folio 95, illus. sheet, 1903, fig. 5.—Grabau and Shiner, N. A. Index Fossils, 1, 1906, p. 84, fig. 137.

Favosites gothlandicus Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 298, pl. 2, figs. 1a, b.

Silurian (Brassfield-Guelph): Drummonds Island, Lake Huron; Anticosti; Ontario; Michigan; Missouri; Iowa; Ohio; Kentucky; etc.

Plesiotypes.—Cat. No. 52654, U.S.N.M. (Davis).

Favosites favosus integritabulatus Swartz.

Favosites favosus var. *integritabulatus* Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 214, pl. 24, figs. 1, 2.

Helderbergian (Keyser): Warrior Mountain, east of Flintstone, Maryland.

Favosites forbesi Edwards and Haime.

Favosites forbesi Edwards and Haime, British Foss. Corals, 1854, p. 258.—Lindstrom, Ofvers K. Vet. Akad. Forhandl., 30, 4, 1873, p. 22.—Nicholson, Geol. Mag., 10, 1873, p. 569; Canadian Jour., n. s., 14, 1873, p. 40, 45; Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 48, pl. 7, fig. 8; pl. 8, fig. 4; Trans. Royal Soc. Edinburgh, 27, 1876, p. 247; Tab. Corals Pal. Period, p. 56, pl. 1, fig. 7; pl. 2, figs. 1-3; pl. 3, figs. 1, 2.—Roemer, Leth. Geog., pt. 1, Leth. Pal., 1883, p. 421, pl. 9, fig. 5a-c.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 8, figs. 5, 6.—Weissmehl, Zeits. d. d. geol. Gesell., 46, 1894, p. 648, pl. 52, fig. 1.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 50.—Pocta, Syst. Sil. du Centre Boheme, 8, pt. 2, 1902, p. 339, fig. 16, pl. 87, 100.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 31.

Silurian: Europe; Rochester, etc., New York; Ontario; Kentucky; Tennessee (Niagaran); Anticosti.

Plesiotype.—Cat. No. 52658, U.S.N.M. (Davis).

FAVOSITES FORBESI var. **DISCOIDEA** Roemer. See *Favosites discoidea*.

FAVOSITES FORBESI var. **EIFELENSIS** Hortedahl. See *Favosites pyriformis*.

Favosites forbesi occidentalis Hall.

Favosites Forbesi var. *occidentalis* Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, pl. 4, figs. 6-15; *ibid.*, mus. ed., 1879, p. 109, pl. 4, figs. 6-15; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 229, pl. 1, figs. 11-14; pl. 3, figs. 6-15.—Miller, N. A. Geol. Pal., 1889, p. 188, figs. 175.—Girty, Amer. Geol., 15, 1895, pp. 134-136, pl. 7, figs. 1-26; pl. 8, figs. 20-25, figs. 1-5.—Weissmehl, Zeits. Geol. Gesell., 49, 1897, p. 377, fig. 2.

Favosites Forbesi var. *Waldronensis* Nicholson, Tab. Corals Pal. Period, 1879, p. 60, pl. 2, figs. 2-2b.

Niagaran (Waldron): Waldron, Indiana; Newsom, etc., Tennessee.

FAVOSITES FORBESI var. **WALDRONENSIS** Nicholson. See *Favosites forbesi occidentalis*.

Favosites gaspensis Lambe.

Favosites Gaspensis Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 8.

Silurian(?): L'Anse au Gascon, Baie des Chaleurs, Quebec

Favosites goldfussi (Castelnau).

Not recognized.

Calamopora goldfussi Castelnau, Syst. Sil., 1843, p. 47.

?*Favosites goldfussi* Miller, N. A. Geol. Pal., 1889, p. 188, fig. 176.

Silurian: Manitoulin Islands, Lake Huron, and Sturgeon Bay, Wisconsin.

FAVOSITES GOTHLANDICA Foerste. See *Favosites favosus*.

Favosites gothlandicus (Fought).

Corallium gothlandicum Fought, Amoen. Acad., 1, 1749, p. 106, pl. 4, fig. 27.

Calamopora gothlandica Goldfuss, Petrefacta, 1826, p. 78, pl. 26, figs. 3a-e; *ibid.*, 2d ed., 1862, p. 73.—Troost, 5th Geol. Rep. Tennessee, 1840, p. 69.—Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, pl. 16, fig. 3.—Roemer, Sil. Fauna West Tennessee, Breslau, 1860, p. 18, pl. 2, figs. 9, 9a, 9b.

Favosites gothlandica Lam., Syst., 2, 1816, p. 206.—Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, p. 232.—Salter, Sutherland's Jour. Voyage in Baffin's Bay, etc., 2, App., 1852, p. 228.—Edwards and Haime, Mon. British Foss. Corals, Pal. Soc., 1854, p. 256, pl. 60, figs. 1, 1a.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 305, fig. 302; Proc. Portland Soc. Nat. Hist., 1, 1863, p. 106.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 83.—Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 32.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 50.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 3, pl. 1, fig. 1.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 30.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 244.—Lambe, Cruise of the "Neptune," App. 4, 1906, p. 325.

Silurian: Europe and (?)America.

Observation.—Typical *F. gothlandicus* is probably not represented in American strata. The above references to American Silurian forms have not been accurately determined. *F. favosus* and *F. niagarensis* are the principal American species usually identified as *F. gothlandicus*.

FAVOSITES HALLIANA Nicholson. See *Cladopora multipora*.

Favosites helderbergiae præcedens Schuchert.

Favosites niagarensis? Hall, Pal. New York, 2, 1852, p. 324, pl. 73, figs. 1a-1e.

Favosites helderbergiae præcedens Schuchert, Am. Geol., 31, 1903, p. 164.—Grabau, Bull. New York State Mus., 92, 1906, p. 108, fig. 7.—Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 209, pl. 22, figs. 2-7.

Helderbergian: Schoharie, Litchfield, etc., New York (Coeymans); Cash Valley, Pinto, etc., Maryland; West Virginia; Pennsylvania (Keyser).

Cotypes.—Cat. No. 10533, U.S.N.M.

Favosites hisingeri Edwards and Haime.

Favosites hisingeri Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, p. 240, pl. 17, figs. 2-2b; Mon. British Foss. Corals, Pal. Soc., 1854, p. 259, pl. 61, figs. 1a, 1b.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 51.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 6.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 29.

Favosites hisingeri—Continued.

- Astrocerium parasiticum* Hall, Pal. New York, 2, 1852, p. 122, pl. 34, fig. 2a-i.
Favosites parasiticum Grabau, Bull. New York State Mus., 45, 1901, p. 141, fig. 35;
 Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 141, fig. 35.
Astrocerium venustum Hall, Pal. New York, 2, 1852, p. 120, fig.; p. 121, pl. 34,
 figs. 1a-j; Rep. Geol. Surv. Wisconsin, 1862, p. 66, fig. 1.—Whitfield, Geol.
 Wisconsin, 4, 1882, p. 270, pl. 13, figs. 8-10.—Chamberlin, Geol. Wisconsin, 1,
 1883, p. 188, fig.
Calamopora venusta Rominger, Amer. Jour. Sci. Arts, 2d ser., 34, 1862, p. 394.
Favosites venustus Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1855, p.
 83.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 390.—Nichol-
 son and Hinde, Canadian Jour., n. s., 14, 1874, p. 147.—Nicholson, Geol.
 Surv. Ohio, Pal., 2, 1875, p. 226; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 52.—
 Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 23, pl. 5, fig. 3.—Hall, 17th
 Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 253, pl. 2, figs. 7, 8.—
 Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 9, figs.
 7, 10.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 243, fig.—
 Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 335.—Grabau, Bull. Buffalo
 Soc. Nat. Sci., 7, 1901, p. 140, fig. 34; Bull. New York State Mus., 45, 1901, p.
 140, fig. 34.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 84, fig.
 136a, b.
 Silurian: England, etc. Various localities in the Cataract and Niagaran of the
 United States and Canada.

Favosites hisingeri aplata Foerste.

- Favosites hisingeri-aplata* Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 290,
 pl. 2, fig. 2; pl. 4, fig. 5.
 Clinton (Waco): Near Estill Springs, north of Irvine, etc., Kentucky.

Favosites hispidus Rominger.

- Favosites hispidus* Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 23, pl. 5,
 fig. 4.
 Niagaran: Drummond's Island, Lake Huron; Point Detour, Michigan.
 Observation.—Probably the same as *F. hisingeri*.

Favosites louisvillensis Davis.

- Favosites louisvillensis* Davis, Kentucky Foss. Corals, Geol. Surv. Kentucky, pt.
 2, 1885, pl. 9, fig. 6.
 Niagaran (Louisville): Near Louisville, Kentucky.

Favosites louisvillensis Greene.

- Favosites louisvillensis* Greene, Cont. Indiana Pal., 1, pt. 19, 1904, p. 186, pl. 34,
 fig. 2.
 Niagaran (Louisville): Near Louisville, Kentucky.
 Observation.—On account of the synonymy that undoubtedly exists among the
 Louisville corals, it is useless to propose a new name for this preoccupied term.
 Moreover it is possible that both names refer to the same species.

FAVOSITES LYCOPERDON OWEN. See *Chaetetes lycoperdon*.**Favosites lycopodites** Vanuxem.

Not recognizable.

- Favosites lycopodites* Vanuxem, Geol. Rep. 3d District New York, 1842, p. 46,
 fig. 3.—Emmons, Nat. Hist. New York, Geol., 2, 1842, p. 389, fig. 3; p. 395.—
 Mather, Nat. Hist. New York, Geol., 1, 1843, p. 397, fig. 3.—Lesley, Geol.
 Surv. Pennsylvania, Rep. P 4, 1889, p. 242, fig.
 Trenton: New York, etc.

Favosites maximus (Troost).

Not recognised.

Calamopora maximus Troost, 5th Rep. Geol. Tennessee, 1840, p. 73.*Favosites maxima* Owen, Geol. Expl. Iowa, Wisconsin, Illinois, 2d ed., 1844, p. 76, fig. 7, pl. 13.—Yandell and Shumard, Contr. Geol. Kentucky, 1847, p. 7.*Favosites cf. maximus* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 115, pl. 15, figs. 4, 5.

"Mountain limestone": Near Nashville, Tennessee.

Observation.—Troost's description probably refers to a large-celled variety of *Columnaria alveolata*, abundant in the Richmond group north of Nashville. Owen's figures are of a true *Favosites*, probably *F. favosus*. Grabau's reference is also to a true *Favosites*.

FAVOSITES MULTIPORA Nicholson. See *Cladopora multipora*.**Favosites niagarensis** Hall.

Favosites niagarensis Hall, Pal. New York, 2, 1852, p. 125, pl. 34a (bis), fig. 4a-i.—Billings, Canadian Nat. Geol., 1, 1856, p. 60, pl. fig. 1; *ibid.*, 4, 1859, p. 103.—Nicholson, Canadian Jour., n. s., 14, 1873, p. 40.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 190, fig.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1895, pl. 8, figs. 3, 4.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 334; Geol. Surv. Ohio, Pal., 7, 1893, p. 601.—Lambe, Cont. Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 7.—Grabau, Bull. New York State Mus., 45, 1901, pp. 142, 143, fig. 38; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 142, fig. 38.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 28; Bull. New York State Mus., 65, 1903, p. 48.—Shimer, Bull. New York State Mus., 80, 1905, p. 236.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 85.

Niagaran: Niagara Falls, Lockport, etc., New York (Rochester); Ontario; Michigan; Iowa; Kentucky; Tennessee; etc.

FAVOSITES NIAGARENSIS? Hall (part). See *Favosites helderbergiae* præcedens.**FAVOSITES NIAGARENSIS** Rominger. See *Paleofavosites asper*.**FAVOSITES NIAGARENSIS** var. *SPINIGERA* Hall. See *Favosites spinigerus*.**Favosites obliquus** Rominger.

Favosites obliquus Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 24, pl. 28, fig. 2.

Niagaran: Point Detour, Michigan; Drummonds Island, Lake Huron; Masonville, Iowa.

Favosites obpyriformis Foerste.

Favosites obpyriformis Foerste, Jour. Geol., 11, 1903, p. 713; Bull. Sci. Lab. Denison Univ., 14, 1909, p. 100, pl. 4, fig. 74.

Niagaran (Brownsport): Near Vice, Decatur County, Tennessee.

Favosites occidens Whitfield.

Favosites occidens Whitfield, Ann. Rep. for 1877, Wisconsin Geol. Surv., 1878, p. 78; Geol. Wisconsin, 4, 1882, p. 313, pl. 23, figs. 6, 7.

Niagaran (Guelph): Ozaukee, etc., Wisconsin.

FAVOSITES PARASITICUS Hall. See *Favosites hisingeri*.**FAVOSITES PROLIFICUS** Billings. See *Paleofavosites asper*.**Favosites pyriformis** (Hall).

Asterocerium pyriforme Hall, Pal. New York, 2, 1852, p. 123, pl. 34A, fig. 1a-e.

Favosites pyriformis—Continued.

Favosites pyriformis Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 25.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 141, fig. 36; Bull. New York State Mus., 45, 1901, p. 141, fig. 36.—Weller, Geol. Surv. New Jersey, 3, 1903, p. 220, pl. 17, figs. 3-5.—Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 211, pl. 23, figs. 1-4.

Favosites forbesi eifelensis Hortedahl, 2d Arct. Exp. Fram, 1898-1902, No. 32, 1914, p. 11, pl. 4, figs. 5, 6.

Clinton (Rochester) and Niagaran (Lockport): Lockport, etc., New York.

Helderbergian: Two miles south of Tristates, New York (Decker Ferry); Cook-erly, etc., Maryland (Keyser); southwestern Ellesmereland, Arctic America. Observation.—The Helderbergian specimens described by Weller, Swartz, and Hortedahl probably belong to a distinct species or variety as noted by the last author.

Favosites pyriformis kokomoensis Foerste.

Favosites pyriforme-kokomoensis Foerste, Cincinnati Soc. Nat. Hist., Jour., 2, 1909, p. 9, pl. 1, figs. 17a-d, pl. 2, fig. 15.

Cayugan (Kokomo): Kokomo, Indiana.

Favosites rectangularis Grabau.

Favosites rectangularis Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 111, pl. 14, figs. 3, 4.

Upper Monroan (Anderdon): Salt shaft, Detroit, Michigan; Amherstburg, Ontario.

FAVOSITES SERIATA Nicholson. See *Cladopora seriata*.**Favosites spinigerus** Hall.

Favosites Niagarensis? var. *spinigera* Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, pl. 4, fig. 1-5.

Favosites spinigerus Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 108, pl. 4, figs. 1-5; 11th Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 228, pl. 3, figs. 1-5; pl. 8, figs. 1, 2.—Girty, Amer. Geol., 15, 1895, p. 136, pl. 8, figs. 6-15.

Favosites excretus Hall, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, pl. 9, figs. 1, 2.

Favosites spongilla Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 25.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 8, figs. 7-9.

Niagaran (Waldron-Brownspout): Waldron, St. Paul, etc., Indiana; Newcom, etc., Tennessee; Louisville, Kentucky.

Plesiotype.—Cat. No. 52645, U.S.N.M.

FAVOSITES SPONGILLA Rominger. See *Favosites spinigera*.**Favosites striatus** Say.

Not recognized.

Favosites striatus Say, Amer. Jour. Sci., 1, 1818, p. 384.

Silurian: Falls of the Ohio, etc.

Favosites subelongus Savage.

Favosites subelongus Savage, Bull. Geol. Surv., Illinois, 23, 1913, p. 64, pl. 3, figs. 9, 10.

Upper Medinan (Edgewood): Near Edgewood, Louisiana, and south of Clarksville, Pike County, Missouri.

Favosites troosti Edwards and Haime.

Favosites troosti Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), p. 238, pl. 18, figs. 1, 1a.—Billings, Canadian Jour., n. s., 4, 1859, p. 103.—Nicholson, Canadian Jour., n. s., 14, 1873, p. 40.

Favosites troostii—Continued.

Silurian: Iowa.

Observation.—Although recorded from the Silurian of Iowa, this species is undoubtedly a Devonian form like *F. hemisphericus*.

Favosites tuberoides Grabau.

Favosites tuberoides Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 112, pl. 14, fig. 2.

Upper Monroan (Amherstburg): Detroit River, opposite Amherstburg, Ontario.

Favosites venustus Hall. See *Favosites hisingeri*.**FENESTELLA** Lonsdale. (Not *Fenestella* Boltin 1798.) Genotype: *Gorgonia antiqua* Goldfuss. Accepted genotype: *Fenestella plebeia* McCoy.

Fenestella Lonsdale, Murchison's Sil. Syst., 1839, p. 677.—Phillips, Pal. Foss., 1841, p. 22.—McCoy, Synopsis Carb. Foss. Ireland, 1844, p. 200.—Lonsdale, Russia and the Ural Mountains, 1, Appendix A, 1845, p. 629.—King, Mon. Perm. Foss., 1850, p. 34.—McCoy, British Pal. Foss., 1854, p. 49.—Hall, Amer. Jour. Sci. Arts, 2d ser., 23, 1857, pp. 203–204.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 165.—Eichwald, Leth. Rossica, 1, 1860, p. 356.—Nicholson, Pal. Province Ontario, 1874, p. 104.—Zittel, Handb. Pal., 1, Munich, 1880, p. 600.—Vine, Geol. Mag., dec. 2, 7, 1880, p. 511.—Shrubsole, Quart. Jour. Geol. Soc. London, 37, 1881, p. 179.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 150.—Claypole, Quart. Jour. Geol. Soc. London, 39, 1883, p. 31.—Vine, Proc. Yorkshire Geol. Polyt. Soc., n. s., 8, 1884, p. 164; Rep. 53d Meeting British Assoc. Adv. Sci., 1884, p. 190 (restricted).—Hall, Rep. State Geol. New York for 1884, 1885, p. 35.—Waagen and Pichl, Pal. Indica, ser. 13, 1885, pp. 773, 776.—Ulrich, Contr. Amer. Pal., 1, 1886, p. 4.—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 83.—Hall and Simpson, Pal. New York, 6, 1887, p. 22.—Miller, N. A. Geol. Pal., 1889, p. 302.—Girty, Mon. U. S. Geol. Surv., 32, pt. 2, 1889, pp. 5, 18.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 395, 534.—Pocta, Syst. Sil. Boheme, 8, pt. 1, 1890, p. 40.—Whidborne, Devon. Fauna England (Pal. Soc. Publ.), 2, pt. 4, 1895, p. 165.—Simpson, 13th Ann. Rep. State Geol. New York for 1893, 1895, pp. 687, 724; 47th Ann. Rep. New York State Mus., pp. 881, 918.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 281.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 500.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 159.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, pp. 37, 244.—Grabau, Bull. New York State Mus., 45, 1901, p. 170; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 170.—Condra, Nebraska Geol. Surv., 2, pt. 1, 1903, p. 49.—Cumings, Amer. Jour. Sci., 17, 1904, pp. 49, 58; *ibid.*, 20, 1905, p. 169, pls. 5–7.—Hennig, Archiv. fur Zool., K. Sven. Vet.-Akad. Stockholm, 3, 1906, p. 1.—Cumings, 30th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1906, p. 1276.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 50.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 142.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 746.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 175; Zittel-Eastman Textb. Pal., 1913, p. 341.

Fenestrella (in error for *Fenestella*) D'Orbigny, Prodr. de Pal., 1, 1850, p. 44.

Actinostoma Young and Fenest., Quart. Jour. Geol. Soc. London, 30, 1874, p. 681.—Vine, Proc. Yorkshire Geol. Polyt. Soc., 9, 1885, p. 84.

Flabelliporina Simpson, 13th Ann. Rep. State Geol. New York for 1893, 1895, pp. 703, 724; 47th Ann. Rep. New York State Mus., pp. 897, 918; 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 521.

FENESTELLA ACMEA Hall. See *Semicocinium acmeum*.

Fenestella acuticosta Roemer.

Fenestella acuticosta Roemer, Sil. Fauna West. Tennessee, 1860, p. 30, pl. 2, fig. 15, 15a.

Niagaran (Brownspport): Perry County, Tennessee.

Fenestella (Cycloporina) altidorsata Ulrich and Bassler.

Fenestella (Cycloporina) altidorsata Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 282, pl. 45, fig. 15; pl. 49, figs. 1-3.

Helderbergian (Keyser): Devils Backbone, near Cumberland, Maryland.

Cotypes.—Cat. No. 60749, U.S.N.M.

FENESTELLA AMBIGUA Hall. See *Loculipora ambigua*.

FENESTELLA ASPERA Hall. See *Chasmatopora aspera*.

Fenestella bellistriata Hall.

Fenestella bellastriata Hall, Trans. Albany Inst., 10, 1883, p. 63 (abstract, 1871, p. 7); 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 252.—Ulrich, Geol. Surv. Illinois, 8, 1890, pl. 54, fig. 2.

Niagaran (Waldron): Waldron, Indiana.

Plesiotype.—Cat. No. 44081, U.S.N.M.

Fenestella bicornis Spencer.

Not recognizable.

Fenestella bicornis Spencer, Trans. St. Louis Acad. Sci., 4, 1884, p. 604, pl. 7, fig. 2; Bull. Mus. Univ. State Missouri, 1, 1884, p. 55, pl. 7, 2.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 247.

Clinton: Hamilton, Ontario.

FENESTELLA CONFERTA Hall. See *Polypora conferta*.

Fenestella cribrrosa Hall.

Fenestella cribrrosa Hall, Pal. New York, 2, 1852, p. 166, pl. 40D, figs. 3a, b.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 50, 51, pl. 19, figs. 3-5.

Clinton (Rochester): Lockport and Middleport, New York.

Plesiotype.—Cat. No. 35553, U.S.N.M.

Fenestella cumberlandica Ulrich and Bassler.

Fenestella cumberlandica Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 280, pl. 47, figs. 1, 2.

Helderbergian (Keyser): Cash Valley, etc., near Cumberland, Maryland.

Cotypes.—Cat. No. 60745, U.S.N.M.

Fenestella elegans Hall.

Fenestella elegans Hall, Pal. New York, 2, 1852, p. 164, pl. 40D, figs. 1a-g.—Chapman, Canadian Jour., n. s., 7, 1862, p. 109, fig. 87; *ibid.*, 8, 1863, p. 212, fig. 217; Expos. Min., Geol. Canada, 1864, p. 112, fig. 87; p. 184, fig. 217.—Grabau, Bull. New York State Mus., 45, 1901, p. 170, fig. 70; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 170, fig. 70.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 51, pl. 19, figs. 1, 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 142, fig. 198.

Clinton (Rochester): Lockport, Rochester, etc., New York; Ontario.

FENESTELLA FLABELLIFORMIS Eichwald. See *Dictyonema flabelliforme*.

FENESTELLA GRACILIS Hall. See *Chasmatopora gracilis*.

Fenestella granulosa Whitfield.

Fenestella granulosa Whitfield, Ann. Rep. Geol. Surv. Wisconsin for 1877, 1878, p. 68; Geol. Surv. Wisconsin, 4, 1882, p. 252, pl. 12, figs. 1, 2.—Buel, Trans. Wisconsin Acad. Sci., 5, 1882, p. 187.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 173, fig.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 835, pl. 29, figs. 7, 7a.

Fenestella oxfordensis Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 159, pl. 6, fig. 13.

Richmond: Delafield, etc., Wisconsin (Maquoketa); Oxford, etc., Ohio (Waynesville-Whitewater).

Plesiotype.—Cat. No. 43635, U.S.N.M. (Holotype of *F. oxfordensis*.)

FENESTELLA INCEPTA Hall. See *Chasmatopora incepta*.

FENESTELLA NERVATA Nicholson. See *Ptiloporella nervata*.

FENESTELLA OXFORDENSIS Ulrich. See *Fenestella granulosa*.

Fenestella parvulipora Hall.

Fenestella parvulipora Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 12, figs. 1-9; *ibid.*, Mus. ed., 1879, p. 123, pl. 12, figs. 1-9; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 249, pl. 11, figs. 1-9.

Niagaran (Waldron): Waldron, Indiana.

Fenestella pertenuis Hall.

Fenestella pertenuis Hall, Trans. Albany Inst., 10, 1883, p. 62 (abstract, 1879, p. 6); 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 251.

Niagaran (Waldron): Waldron, Indiana.

FENESTELLA PRISCA? Hall. See *Semicoecinium tenuiceps*.

Fenestella prolixa Hall.

Fenestella prolixa Hall, Trans. Albany Inst., 10, 1883, p. 64 (abstract, 1879, p. 8); 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 253.

Niagaran (Waldron): Waldron, Indiana.

FENESTELLA PUNCTOSTRIATA Hall. See *Polypora punctostriata*.

Fenestella subarctica Whiteaves.

Fenestella subarctica Whiteaves, Geol. Surv. Canada, Ann. Rep., n. s., 14, App. F, 1904, p. 39; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 249, pl. 23.

Niagaran: Ekwan River, Canada.

FENESTELLA TANTULUS Hall. See *Polypora tantula*.

FENESTELLA TENUICEPS Hall. See *Semicoecinium tenuiceps*.

Fenestella tenuis Hall.

Fenestella tenuis Hall, Pal. New York, 2, 1852, p. 51, pl. 19, figs. 5a-c.

Clinton: Wolcott Furnace, Whiting's Mill, Wayne County, New York.

FISTULIPORA McCoy.

Genotype: *Fistulipora minor* McCoy = *Calamopora incrustans* Phillips.

Fistulipora McCoy, Ann. Mag. Nat. Hist, 2d ser., 3, 1850, p. 131, figs. a, b.—Milne-Edwards and Haime, Pol. Foss. Terr. Pal., 1851, p. 219.—McCoy, British Pal. Foss., 1854, p. 11; Contr. British Pal., 1854, p. 99.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 438.—Billings, Canadian Nat. Geol., 3, 1858, p. 419; Geol. Surv. Canada, Rep. Progr. for 1857, 1858, p. 165; Canadian Jour., n. s., 4,

FISTULIPORA—Continued.

- 1859, p. 97.—Milne-Edwards, *Hist. Nat. des Corall.*, 3, 1860, p. 238.—Nicholson, *Pal. Prov. Ontario*, 1874, p. 63.—Dybowski, *Verh. Mineral. Gesell. St. Petersburg* (2), 10, 1876, p. 180.—Lindstrom, *Ann. Mag. Nat. Hist.*, ser. 4, 18, 1876, p. 6.—Nicholson and Etheridge, *Mon. Sil. Foss. Girvan Dist.*, 1878, p. 38.—Nicholson, *Pal. Tabulate Corals*, 1879, p. 292.—Zittel, *Handb. d. Pal.*, 1, 1880, p. 616; Genus *Monticulipora*, 1881, p. 91.—Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 156.—Roemer, *Leth. geog.*, pt. 1, *Leth. Pal.*, 1883, p. 477; *Jour. Cincinnati Soc. Nat. Hist.*, 7, 1884, p. 43.—Thompson, *Proc. Phil. Soc. Glasgow*, 14, 1883, p. 351.—Nicholson and Foord, *Ann. Mag. Nat. Hist.*, 5th ser., 16, 1885, p. 500.—Waagen and Wentzel, *Pal. Indica*, 13th ser., 1886, pp. 909, 922.—Hall and Simpson, *Pal. New York*, 6, 1887, p. 18.—James and James, *Jour. Cincinnati Soc. Nat. Hist.*, 11, 1888, p. 32.—Miller, *N. A. Geol. Pal.*, 1889, p. 305.—Ulrich, *Geol. Surv. Illinois*, 8, 1890, pp. 382, 474.—J. F. James, *Jour. Cincinnati Soc. Nat. Hist.*, 18, 1896, p. 119.—Ulrich, *Zittel's Textb. Pal. (Engl. ed.)*, 1896, p. 269; p. 105 (not Ulrich).—Simpson, 14th *Ann. Rep. State Geol. New York* for 1894, 1897, p. 559.—Lindstrom, *Kongl. Sven. Vet. Akad. Handl.*, 32, 1899, pp. 48, 52.—Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, pp. 25, 266.—Condra, *Nebraska Geol. Surv.*, 2, pt. 1, 1903, p. 29.—Cumings, 30th *Ann. Rep. Dep. Geol. Nat. Res. Indiana*, 1906, p. 1292.—Bassler, *Bull. U. S. Geol. Surv.*, 292, 1906, p. 22.—Grabau and Shimer, *N. A. Index Fossils*, 1, p. 124.—Hennig, *Archiv. f. Zool.*, 4, pt. 21, 1908, p. 16.—Bassler, *Zittel-Eastman Textb. Pal.*, 1912, p. 329.—Ulrich and Bassler, *Maryland Geol. Surv.*, *Low. Dev.*, 1913, p. 282.
- Didymopora* Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 156.
- Dybowskia* Waagen and Pichl, *Pal. Indica*, ser. 13, p. 717.
- Dybowskiella* Waagen and Wentzel, *Pal. Indica*, 13th ser., 1886, pp. 910, 916.—Stuckenberg, *Mem. du Comite Geologique Russia*, 10, 3, 1895, p. 22.—Lindstrom, *Kongl. Sven. Vet.-Akad. Handl.*, 32, 1899, pp. 52, 53.
- Lichenalia* (not Hall, 1852) Hall and Simpson, *Pal. New York*, 6, 1887, p. xvi.—Foerste, *Bull. Sci. Lab. Denison Univ.*, 2, 1887, p. 168.—Miller, *N. A. Geol. Pal.*, 1889, p. 311.—Simpson, 14th *Ann. Rep. State Geologist New York* for 1894, 1897, p. 559.—Grabau, *Bull. Buffalo Soc. Nat. Sci.*, 6, 1889, p. 171.

Fistulipora crustula Bassler.

- Ceramopora incrustans* Hall, *Pal. New York*, 2, 1852, p. 169, pl. 40E, figs. 2a-d.—Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 198.—Grabau, *Bull. New York State Mus.*, 45, 1901, p. 163, fig. 59; *Bull. Buffalo Soc. Nat. Sci.*, 7, 1901, p. 163, fig. 59.
- Fistulipora crustula* Bassler, *Bull. U. S. Geol. Surv.*, 292, 1906, p. 24, pl. 7, figs. 7-10; pl. 8, figs. 16, 17; pl. 23, fig. 15.
- Clinton (Rochester): Lockport, Rochester, etc., New York; Grimsby, Ontario.
- Cotypes*.—Cat. No. 35481, U.S.N.M.

FISTULIPORA FLABELLATA Ulrich. See *Chiloporella flabellata*.**Fistulipora halli** Rominger.

- Fistulipora Halli* Rominger, *Proc. Acad. Nat. Sci. Philadelphia*, 1886, p. 119.
- Lichenalia concentrica* var. *parvula* Hall, 28th *Ann. Rep. New York State Mus.*, doc. ed., 1876, pl. 7, figs. 1, 2; *ibid.*, mus. ed., 1879, p. 117, pl. 7, figs. 1, 2. 11th *Ann. Rep. Indiana Geol. Nat. Hist.*, 1882, p. 241, pl. 6, figs. 1, 2.—Leahy, *Geol. Surv. Pennsylvania*, Rep. P 4, 1889, p. 340, figs.
- Niagara (Waldron): Waldron, Indiana; Newsom, Tennessee.

Fistulipora hemispherica (Roemer).

Thecostegites hemisphericus Roemer, Sil. Fauna West. Tennessee, 1860, p. 25, pl. 2, figs. 3, 3a.—Miller, N. A. Geol. Pal., 1889, fig. 228 (p. 207).

Fistulipora hemispherica Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 270.

Fistulipora (*Thecostegites*) *hemispherica* Foerste, Jour. Geol., 11, 1903, p. 712 (loc. occ.).

Niagaran (Brownsport): Perry and Wayne Counties, Tennessee.

Fistulipora laminata (Hall).

Callopora laminata Hall, Pal. New York, 2, 1852, p. 146, pl. 40, figs. 3a-e.

Leioclema? *laminatum* Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 416, 425.

Lioclema (?*Nicholsonella*) *laminatum* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 304.

Fistulipora laminata Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 22, 23, pl. 7, figs. 4-6; pl. 8, figs. 9, 10.

Clinton (Rochester): Lockport and Rochester, New York; Grimsby, Ontario.

Plesiotype.—Cat. No. 35467, U.S.N.M.

FISTULIPORA? LAXATA Ulrich. See *Favositella laxata*.

FISTULIPORA LENS Whitfield. See *Calloporella? lens*.

Fistulipora lockportensis Bassler.

Fistulipora lockportensis Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 23, pl. 7, figs. 1-3.

Clinton (Rochester): Lockport and Rochester, New York.

Cotypes.—Cat. No. 35469, U.S.N.M.

Fistulipora? multipora James.

Fistulipora? multipora James, Paleontologist, 1, 1878, p. 2.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 38.

Cincinnati: Cincinnati, Ohio, and vicinity.

Observation.—Not a valid species. Insufficiently described and types include a variety of forms.

Fistulipora neglecta Rominger.

Fistulipora neglecta Rominger, Proc. Acad. Nat. Sci. Philadelphia, 1866, p. 119.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 272.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 125.

Lichenalia concentrica Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 5, figs. 9-16; pl. 6, figs. 1, 2, 4, 7-10; pl. 7, figs. 3-11; *ibid.*, mus. ed., 1879, p. 116, pl. 5, figs. 9-16; pl. 6, figs. 1, 2, 4, 7-10; pl. 7, figs. 3-11.—Quenstedt, Roehren- und Sternkorallen, 1881, p. 95, pl. 146, 71, 72.—Hall, 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 240, pl. 4, figs. 9-16; pl. 5, figs. 1, 2, 4, 7-10; pl. 6, figs. 3-11.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, pl. 3, fig. 5.—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 168, pl. 17, 10.

Niagaran (Waldron): Waldron, Indiana; Newsom, Tennessee.

Fistulipora neglecta maculata (Hall).

Lichenalia concentrica var. *maculata* Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1876, pl. 6, figs. 3, 5, 6; *ibid.*, mus. ed., 1879, p. 117, pl. 6, figs. 3, 5, 6; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 241, pl. 5, figs. 3, 5, 6.—Leeley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 340, fig.

Fistulipora neglecta-maculata Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 272.

Niagaran (Waldron): Waldron, Indiana; Newsom, Tennessee.

FISTULIPORA OWENI James. See *Coeloclema oweni*.

FISTULIPORA RUGOSA Whitfield. See *Batostoma? rugosum*.

Fistulipora siluriana James.

Fistulipora siluriana James, *Paleontologist*, No. 3, 1879, p. 19.—Bassler, *Proc. U. S. Nat. Mus.*, 30, 1906, p. 39.

Cincinnatian: Cincinnati, Ohio, and vicinity.

Observation.—Not a valid species. The types are not figured, are insufficiently described, and proved upon examination to include several distinct species.

FISTULIPORA SOLIDISSIMA Whitfield. See *Lioclemella solidissima*.

Fistulipora tuberculosa (Hall).

Rhinopora tuberculosa Hall, *Pal. New York*, 2, 1852, p. 170, pl. 40E, figs. 4a-c.—Grabau, *Bull. New York State Mus.*, 45, 1901, p. 175, fig. 77; *Bull. Buffalo Soc. Nat. Sci.*, 7, 1901, p. 175, fig. 77.

Fistulipora tuberculosa Bassler, *Bull. U. S. Geol. Surv.*, 292, 1906, p. 23, pl. i, figs. 11-15; pl. 8, figs. 7, 8; pl. 23, fig. 14.

Clinton (Rochester): Lockport, New York; Grimsby, Ontario.

Thin sections of *holotype* and *plesiotype*.—Cat. Nos. 35485, 35486, U.S.N.M.

FISTULIPORELLA Simpson. Genotype: *F. constricta* Hall and Simpson.

Fistuliporella Simpson, 14th Ann. Rep. State Geol. New York, 1897, p. 560.—

Ulrich and Bassler, *Maryland Geol. Surv.*, Low. Dev., 1913, p. 262.

Fistuliporella cumulata Ulrich and Bassler.

Fistuliporella cumulata Ulrich and Bassler, *Maryland Geol. Surv.*, Low. Dev., 1913, p. 263, pl. 41, figs. 1-5.

Helderbergian (Keyser): Cash Valley and Pinto, Maryland; Keyser, West Virginia.

Cotypes.—Cat. No. 53661, U.S.N.M.

Fistuliporella marylandica Ulrich and Bassler.

Fistuliporella marylandica Ulrich and Bassler, *Maryland Geol. Surv.*, Low. Dev., 1913, p. 266, pl. 45, figs. 8-11; pl. 48, fig. 4.

Helderbergian (Keyser): Cash Valley, Maryland.

Cotypes.—Cat. No. 60756, U.S.N.M.

Fistuliporella maynardi Ulrich and Bassler.

Fistuliporella maynardi Ulrich and Bassler, *Maryland Geol. Surv.*, Low. Dev., 1913, pl. 46, figs. 3-7.

Helderbergian (Keyser): Cash Valley, Maryland.

Cotypes.—Cat. No. 60755, U.S.N.M.

Fistuliporella minima Ulrich and Bassler.

Fistuliporella minima Ulrich and Bassler, *Maryland Geol. Surv.*, Low. Dev., 1913, p. 265, pl. 43, figs. 13-16.

Helderbergian (Keyser): Cash Valley, Maryland; Keyser, West Virginia.

Holotype.—Cat. No. 53659, U.S.N.M.

Fistuliporella quinquedentata Ulrich and Bassler.

Fistuliporella quinquedentata Ulrich and Bassler, *Maryland Geol. Surv.*, Low. Dev., 1913, p. 264, pl. 41, figs. 6-8.

Helderbergian (Keyser): Keyser, West Virginia.

Holotype.—Cat. No. 53660, U.S.N.M.

FLABELLIPORELLA Simpson. See *Polypora* McCoy.

FLABELLIPORINA Simpson. See *Fenestella* Lonsdale.

FLETCHERIA Edwards and Haime. Genotype: *F. tubifera* Edwards and Haime.
Fletcheria Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), p. 156, 300.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 446.—Milne-Edwards, Hist. Nat. d. Corall, 3, 1860, p. 300.—Duncan, Rep. 41st Meeting British Assoc. Adv. Sci., 1872, p. 130.—Lindstrom, Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 13.—Zittel, Handb. Pal., 1, 1879, p. 235.—Nicholson, Tab. Corals Pal. Period, 1879, p. 206.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 488.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 1, 1889, p. 47.—Sherzer, Amer. Geol., 7, 1891, pp. 296-301.

Fletcheria incerta (Billings).

Columnaria incerta Billings, Canadian Nat. Geol., 4, 1859, p. 428, fig. 1, 2; Geol. Canada, Geol. Surv. Canada, 1863, p. 124, fig. 44, a, b.

Fletcheria incerta Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 48, pl. 1, figs. 8, 8a, 9.

Chazyan: Mingan Islands, Island of Montreal, etc., Quebec; Ottawa, Ontario.

FRAMMIA Hortedahl.

Genotype: *F. dissimilis* Hortedahl.

Frammia Hortedahl, 2d Arct. Exp. Fram, 1898-1902, No. 32, 1914, p. 35.

Frammia dissimilis Hortedahl.

Frammia dissimilis Hortedahl, 2d Arct. Exp. "Fram," 1898-1902, No. 32, 1914, p. 35, pl. 8, figs. 17, 18, 719.

Helderbergian (Lower beds): Southwestern Ellesmereland, Arctic America.

FUCOIDES ALLEGHANIENSIS Taylor. See *Arthropycus alleghaniensis*.

Fucoides auriformis Hall.

Fucoides auriformis Hall, Nat. Hist. New York, Geol., 4, 1843, p. 47, pl. 1, fig. 2; Pal. New York, 2, 1852, p. 7, pl. 3, fig. 3.

Upper Medinan: Medina, etc., New York.

Observation.—Probably a burrow.

FUCOIDES BILOBA Vanuxem. See *Rusophycus biloba*.

FUCOIDES BRONGNIARTII Harlan. See *Arthropycus alleghaniensis*.

FUCOIDES DEMISSUS Vanuxem. See *Phytopsis tubulosa*.

FUCOIDES DENTATUS Brongniart. See *Diplograptus dentatus* and *Diplograptus foliaceus*.

FUCOIDES HARLANI Vanuxem. See *Arthropycus alleghaniensis*.

Fucoides heterophyllus Hall.

Fucoides heterophyllus Hall, Nat. Hist. New York, Geol., 4, 1843, p. 47, pl. 1, fig. 3; Pal. New York, 2, 1852, p. 7, pl. 3, fig. 4.

Upper Medinan: Medina, etc., New York.

Observation.—Probably a burrow.

FUCOIDES LINEARIS Haldemann. See *Scolithus linearis*.

FUCOIDES SERRA Brongniart. See *Tetragraptus serra*.

FUCOIDES SIMPLEX Emmons. See *Diplograptus foliaceus*.

FUNGISPONGIA Ringueberg.

Genotype: *F. irregularis* Ringueberg.

Fungispongia Ringueberg, Proc. Acad. Nat. Sci. Philadelphia, 1884, p. 147.

Fungispongia irregularis Ringueberg.

Fungispongia irregularis Ringueberg, Proc. Acad. Nat. Sci. Philadelphia, 1884, p. 147, pl. 3, fig. 3.

Lower Clinton: Lockport, New York.

FUSISPIRA Hall.

Genotype: *F. ventricosa* Hall.

Fusispira Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 229 (Extract, 1871, p. 5).—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, pp. 315, 316.—Zittel, Handb. Pal., 2, 1882, p. 239.—Miller, N. A. Geol. Pal., 1889, p. 404.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1075.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 697.

Fusispira angusta Ulrich and Scofield.

Fusispira angusta Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1071, pl. 81, figs. 28–31.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 697, fig. 1002e.

Trenton: Near Cannon Falls and near Fountain, Minnesota (Prosser); near Burgin, Kentucky.

Cotypes.—Cat. No. 45811, U.S.N.M.

Fusispira angusta subplana Ulrich and Scofield.

Fusispira angusta var. *subplana*, Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1079, pl. 81, fig. 32.

Trenton (Prosser): Near Cannon Falls, Minnesota.

Cotypes.—Cat. No. 43812, U.S.N.M.

Fusispira calcifera (Billings).

Subulites calcifera Billings, Canadian Nat. Geol., 4, 1859, p. 360, fig. 10; Geol. Canada, Geol. Surv. Canada, 1863, p. 120, fig. 34.—Miller, N. A. Geol. Pal., 1889, p. 428, fig. 717.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1142, fig.

Fusispira calcifera Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1079 (gen. ref.).

Canadian (Romaine): Mingan Islands, Quebec.

Fusispira compacta Hall and Whitfield.

Fusispira compacta Hall and Whitfield, U. S. Geol. Expl. 40th Paral., 4, 1877, p. 236, pl. 1, fig. 25.

Pogonip: Pogonip Mountain, White Pine District, Nevada.

Holotype.—Cat. No. 17365, U.S.N.M.

Fusispira convexa Ulrich and Scofield.

Fusispira convexa Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1077, pl. 80, figs. 8–10.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 697, fig. 1002d.

Trenton: Trenton Falls, New York; near Cannon Falls, Minnesota (Prosser).

Cotypes.—Cat. Nos. 45813, 45814, U.S.N.M.

Fusispira daphne (Billings).

Subulites Daphne Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 223, fig. 206.

Fusispira daphne Ulrich and Scofield, Geol. Minnesota, 1897, p. 1070 (gen. ref.). Chazy (Quebec—L): Point Rich, Newfoundland.

***Fusispira elongata* Hall.**

Fusispira elongata Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, pl. 8, fig. 5, p. 229 (Extract, 1871, p. 6).—Whitfield, Geol. Wisconsin, 4, 1882, p. 245, pl. 9, fig. 3.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 167, fig.—Whiteaves, Pal. Fossils, Geol. Surv. Canada, 3, pt. 3, 1897, p. 200 (loc. occ.).

Trenton: Elkader, Iowa (Prosser); Lower Fort Garry, Manitoba.

***Fusispira inflata* (Meek and Worthen).**

Subulites inflatus Meek and Worthen, Proc. Acad. Nat. Sci., Philadelphia, 1870, p. 47; Geol. Surv. Illinois, 6, 1875, p. 495, pl. 23, fig. 5.

Fusispira inflata Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1075, pl. 80, figs. 17 and 18.—Whiteaves, Pal. Fossils, 1, Geol. Surv. Canada, 3, pt. 3, 1897, p. 199.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 168.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 697, fig. 1002a.

Trenton: Carroll County, Illinois (Galena); Hader, Wykoff, etc., Minnesota (Prosser and Stewartville); Lake Winnipeg, Canada; Baffin Land.

Plesiotypes.—Cat. Nos. 45815, 45816, U.S.N.M.

***Fusispira inflata ventricosa* (Hall).**

Fusispira ventricosa Hall, 24th Rep. New York State Mus. Nat. Hist., 1872, p. 229, pl. 8, fig. 6 (extract, 1871, p. 5).—Whitfield, Geol. Wisconsin, 4, 1882, p. 245, pl. 9, fig. 2.—Miller, N. A. Geol. Pal., 1889, p. 405, fig. 676.—Whiteaves, Canadian Rec. Sci., 5, 1893, p. 328 (loc. occ.).

Fusispira inflata var. *ventricosa* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1075, pl. 80, figs. 17, 18.

Trenton: Depere, West Jefferson, etc., Wisconsin; Stewartville, Wykoff, etc., Minnesota.

***Fusispira intermedia* Ulrich and Scofield.**

Fusispira intermedia Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1076, pl. 80, figs. 19-21.

Trenton (Prosser and Stewartville): Stewartville and south of Cannon Falls, Minnesota.

Cotype.—Cat. No. 45817, U.S.N.M.

***Fusispira nobilis* Ulrich and Scofield.**

Fusispira nobilis Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1078, pl. 80, figs. 2-4.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 168.

Trenton: Wykoff, Pleasant Grove, and Fountain, Minnesota (Prosser); Baffin Land.

Cotypes.—Cat. No. 45818, U.S.N.M.

***Fusispira obesa* (Whitfield).**

Subulites obesus Whitfield, Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 318, pl. 26, fig. 7.

Fusispira obesa Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1070, (gen. ref.).

Canadian (Beekmantown): Fort Cassin, Vermont.

***Fusispira planulata* Ulrich and Scofield.**

Fusispira planulata Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1078, pl. 81, figs. 26, 27.

Trenton (Prosser): Wykoff, Minnesota; Eagle Point, Iowa.

Holotype.—Cat. No. 45819, U.S.N.M.

Fusispira psyche (Billings).

Subulites psyche Billings, *Pal. Fossils*, 1, Geol. Surv. Canada, 1865, p. 188, fig. 169.

Fusispira psyche Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, p. 1077 (gen. ref.).

Canadian (Beekmantown): Near St. Antoine, above Quebec, Canada.

Fusispira schucherti Ulrich and Scofield.

Fusispira schucherti Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, p. 1077, pl. 80, fig. 1.

Black River (Platteville): Beloit, Wisconsin.

Fusispira(?) spicula Sardeson.

Fusispira(?) spicula Sardeson, *Bull. Minnesota Acad. Nat. Sci.*, 3, 1892, p. 334, pl. 6, figs. 10, 11.

Black River (Decorah): Minneapolis, Minnesota.

Fusispira subbrevis Ulrich and Scofield.

Fusispira subbrevis Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, p. 1077, pl. 80, figs. 11-16.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1909, p. 697, fig. 1002b.

Trenton (Prosser and Stewartville): South of Cannon Falls and Stewartville, Minnesota; Decorah, Iowa.

Cotype.—Cat. No. 45820, U.S.N.M.

Fusispira subfusiformis (Hall).

Murchisonia subfusiformis Hall, *Pal. New York*, 1, 1847, p. 180, pl. 39, figs. 2a, b; 3d Rep. New York State Cab. Nat. Hist., 1850, p. 179, pl. 4, fig. 2 (doc. ed., p. 171).—Chapman, *Canadian Jour.*, n. s., 7, 1862, p. 121, fig. 123; *ibid.*, 8, 1863, p. 199, fig. 190; *Expos. Min.*, Geol. Canada, 1864, p. 124, fig. 123; p. 171, fig. 190.—Nicholson, *Rep. Pal. Proc. Ontario*, pt. 2, 1875, p. 18, fig. 7b.

Loxonema subfusiformis D'Orbigny, *Prodr. de Pal.*, 1, 1849, p. 5 (gen. ref.).—Emmons, *Amer. Geology*, 1, pt. 2, 1855, p. 163.

Subulites subfusiformis Billings, *Geol. Canada*, *Geol. Surv. Canada*, 1863, p. 94 (gen. ref.).

Fusispira subfusiformis Hall, 24th Rep. New York State Cab. Nat. Hist., 1871, p. 229 (gen. ref.).—Miller, *Cincinnati Quart. Jour. Sci.*, 1, 1874, p. 316.—Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, p. 1077, pl. 81, figs. 33, 39.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1909, p. 697, fig. 1002c.

Trenton: Jefferson and Lewis Counties, New York; Goodhue and Fillmore Counties, Minnesota; Burgin, Kentucky; Canada.

Plesiotype.—Cat. No. 45821, U.S.N.M.

Fusispira sulcata Ulrich.

Fusispira sulcata Ulrich, *Geol. Minnesota*, 3, pt. 2, 1897, p. 1077, pl. 81, figs. 5-7.

Fusispira cf. sulcata Foerste, *Jour. Cincinnati Soc. Nat. Hist.*, 21, 1914, p. 137, pl. 3, figs. 4, 5.

Trenton (Upper): Rogers Gap and Covington, Kentucky.

Holotype.—Cat. No. 45822, U.S.N.M.

Fusispira terebriformis Hall.

Fusispira terebriformis Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 230, pl. 8, fig. 4 (Extract, 1871, p. 6).—Miller, *Cincinnati Quart. Jour. Sci.*, 1, 1874, p. 316.

Eden (Economy): Cincinnati, Ohio.

FUSISPIRA VENTRICOSA Hall. See *Fusispira inflata ventricosa*.

Fusispira vittata (Hall).

Murchisonia vittata Hall, Pal. New York, 1, 1847, p. 181, pl. 39, figs. 3a, b.

Loxonema vittata D'Orbigny, Prodr. de Pal., 1, 1849, p. 5 (gen. ref.).—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 163.

Fusispira vittata Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 229 (Extract, 1871, p. 5).

Trenton: Adams, Jefferson County, New York.

GAUROCINUS Miller. See *Reteocrinus* Billings.

GAUROCINUS ANGULARIS Miller. See *Ptychocrinus parvus*.

GAUROCINUS COGNATUS Miller. See *Reteocrinus nealli*.

GAUROCINUS SPLENDENS Miller. See *Ptychocrinus splendens*.

GAZACRINUS Miller.

Genotype: *G. inornatus* Miller.

Gazacrinus Miller, 18th Rep. Geol. Surv. Indiana, 1894, p. 305 (adv. sheets, 1892, p. 49); N. A. Geol. Pal., 1st App., 1892, p. 679; *ibid.*, 2d App., 1897, p. 746.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 78, fig. 38 (includes notes on synonymy).—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 188, fig. 119.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 187.

Idiocrinus Wachsmuth and Springer, Amer. Geol., 10, 1892, p. 135; Mem. Mus. Comp. Zool. Harvard (N. A. Crin. Camerata), 20, 1897, p. 202.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 188.—Zittel, Grundzuge Pal., 1, 1910, p. 161. (Genotype: *I. elongatus* Wachsmuth and Springer.)

Gazacrinus immaturus (Hall).

Thysanocrinus immaturus Hall, Pal. New York, 2, 1852, p. 191, pl. 42, figs. 4a-f. *Rhodocrinus* (*Thysanocrinus*) *immaturus* Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 398.

Dimerocrinus immaturus Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 373 (Rev. Pal., pt. 2, p. 199).

Idiocrinus immaturus Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 206, pl. 18, figs. 10a-c.

Clinton (Rochester): Lockport, New York.

Gazacrinus inornatus Miller.

Gazacrinus inornatus Miller, 18th Rep. Indiana Dept. Geol. Nat. Res., 1894, p. 303, pl. 5, figs. 9, 10, 15-17 (adv. sheets, 1892, p. 49, pl. 5, figs. 9, 10, 15-17); N. A. Geol. Pal., 1st App., 1892, p. 679, figs. 1232-33.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 188, fig. 119, 1.

Idiocrinus elongatus Wachsmuth and Springer, Amer. Geol., 10, 1892, p. 136; Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 203, pl. 18, figs. 8a-c.—Bather, Geol. Mag., dec. 4, 6, 1899, p. 126.

Niagaran (Laurel): St. Paul, Shelby County, Indiana.

Gazacrinus major Weller.

Gazacrinus major Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 78, pl. 3, figs. 1, 2.

Niagaran (Racine): Hawthorne, Illinois.

Gazacrinus milliganæ (Miller and Gurley).

Thysanocrinus milliganæ Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 8, 1896, p. 51, pl. 3, figs. 23-25.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 754, fig. 1403.

Niagaran (Brownsport): Decatur County, Tennessee.

Gazacrinus minor Weller.

Gazacrinus minor Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 80, pl. 3, figs. 3, 4.

Niagaran (Racine): Bridgeport, Illinois.

Gazacrinus ventricosus (Wachsmuth and Springer).

Idiocrinus ventricosus Wachsmuth and Springer, Amer. Geol., 10, 1892, p. 137; Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 205, pl. 18, fig. 9a, b.

Gazacrinus ventricosus Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 188, fig.

Niagaran (Laurel): St. Paul, Shelby County, Indiana.

GEINITZELLA Waagen and Wentzel. See *Batostomella* Ulrich.

GEISONOCERAS Hyatt.

Genotype: *Orthoceras rivale* Barnard.

Geisonoceras Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 275; Zittel-Eastman Textb. Pal., 1, 1900, p. 518; *ibid.*, 2d ed., 1913, p. 598.

Geisonoceras shumardi (Billings).

Orthoceras shumardi Billings, Can. Nat. Geol., 4, 1859, p. 460, fig. 36.

Geisonoceras shumardi Ruedemann, Bull. New York State Mus., 90, 1906, p. 437, pl. 12, fig. 4.

Orthoceras (Geisonoceras) shumardi Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 48.

Chazy: Mingan Islands, Canada (Mingan); Chazy, New York (Day Point, Crown Point).

GEOCRINUS D'Orbigny. See *Periechocrinus* Austin.

GERASAPHES Clarke.

Genotype: *G. ulrichana* Clarke.

Gerasaphes Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 710.

Gerasaphes ulrichana Clarke.

Gerasaphes ulrichana Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 710, figs. 14-16.—

Miller, N. A. Geol. Pal., 2d App., 1897, p. 788.—Ruedemann, Bull. New York State Mus., 49, 1906, p. 60.

Trenton (Upper): Mouth of Licking River, Covington, Kentucky.

Holotype.—Cat. No. 41951, U.S.N.M.

GILBERTSOCRINITES AMERICANUS Troost. See *Diabolocrinus vesperalis*.

GILBERTSOCRINITES (?) **DUBIUS** Troost. See *Periechocrinus dubius*.

GILBERTSOCRINITES ROEMERI Troost. See *Dimerocrinus roemeri*.

GIRVANELLA Nicholson and Etheridge.

Genotype: *G. problematica* Nicholson and Etheridge.

Girvanella Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1878, p. 23, pl. 9, fig. 24.—Nicholson, Geol. Mag., dec. 3, 4, 1888, p. 22.—James, J. F.,

Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1, 1891, pp. 50, 51.—Dawson, Canadian Rec. Sci., 7, 1896, p. 212.

Strophochetus Seely, Amer. Jour. Sci. Arts, 3d ser., 30, 1885, p. 357; *ibid.*, 32, 1886, p. 31.—Walcott, Bull. U. S. Geol. Surv., 30, 1886, p. 91.—Hinde, Geol. Mag., dec. 3, 4, 1887, p. 227.—Miller, N. A. Geol. Pal., 1889, p. 165.—Seely,

Rep. State Geol. Vermont, 3, 1902, p. 156. (Genotype: *S. ocellatus* Seely.)

Girvanella antiqua Dawson.

Girvanella antiqua Dawson, Canadian Rec. Sci., 7, 1896, p. 214.

Cambrian or Lower Ordovician boulder: Little Metis, Quebec.

Girvanella atrata (Seely).

Strephochetus atratus Seely, Amer. Jour. Sci. Arts, 3d ser., 32, 1886, p. 32; Rep. State Geol. Vermont, 3, 1902, p. 157, pl. 57, fig. 1, pl. 58, fig. 9.

Chazyan (Crown Point): McBrides Bay, South Hero, Vermont; Chazy, New York.

Girvanella brainerdi (Seely).

Strephochetus Brainerdi Seely, Amer. Jour. Sci. Arts, 3d ser., 32, 1886, p. 32; Rep. State Geol. Vermont, 3, 1902, p. 156, pl. 57, figs. 2, 58, figs. 7, 8.

Chazyan (Crown Point): Chazy, New York.

Observation.—See *G. ocellata* (Seely).

GIRVANELLA LABYRINTHICA Ulrich. See *Streptospongia labyrinthica*.

Girvanella ocellata (Seely).

Strephochetus ocellatus Seely, Amer. Jour. Sci. Arts, 3d ser., 30, 1885, p. 357, figs. 1-3; Amer. Jour. Sci., 3d ser., 32, 1886, p. 31.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1083.—Dawson, Canadian Rec. Sci., 7, 1896, p. 213.—Seely, Rep. State Geol. Vermont, 3, 1902, p. 156, pls. 56, 57, figs. 3, 4, 59.

Chazyan: Addison County, Vermont; Crown Point, New York (Crown Point); East Tennessee (Lenoir).

Observation.—*Girvanella brainerdi* and *G. prunus* Seely are probably synonyms of this species.

Girvanella prunus (Seely).

Strephochetus prunus Seely, Rep. State Geol. Vermont, 3, 1902, p. 160, pl. 57, fig. 5; pl. 58, fig. 6.

Chazyan (Crown Point): South Hero and Isle La Motte, Vermont; Chazy, New York.

Observation.—See *G. ocellata* (Seely).

Girvanella richmondensis (Miller).

Stromatocerium richmondense Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 41, pl. 2, figs. 1, 1a, 1b.—James, J. F., *ibid.*, 9, p. 252.

Girvanella richmondense James, J. F., *ibid.*, 14, pt. 1, 1891, p. 51.

Strephochetus Richmondense Seely, Amer. Jour. Sci. Arts, 3d ser., 32, 1886, p. 33.—Miller, N. A. Geol. Pal., 1889, p. 165, fig. 122.—Seely, Rep. State Geol. Vermont, 3, 1902, p. 157.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 706, pl. 2, figs. 3-3b.

Richmond (Whitewater): Richmond, Indiana.

GISSOCCRINUS Angelin.

Genotype: *Actinocrinus arthriticus* Phillips.

Gissocrinus Angelin, Icon. Crinoid., 1878, p. 10, pl. 3, figs. 1-3, 5b; pl. 29, fig. 75.—Zittel, Handb. Pal., 1, 1879, p. 353.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 312 (Rev. Pal., pt. 1, p. 89); *ibid.*, 1886, pp. 115, 151; *ibid.*, 1889, pp. 285, 312.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 332, pl. 14, fig. 21; Kongl. Sv. Vet. Akad. Handl., 25, No. 2, 1893, p. 152; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 175, fig. 90; Amer. Geol., 26, 1900, p. 308.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 156.—Zittel, Grundzüge Pal., 1, 1910, p. 154.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 220.

Gissocrinus? problematicus Rowley.

Gissocrinus? problematicus Rowley, Amer. Geol., 34, 1904, p. 277, pl. 16, figs. 37-41.

Upper Medinan (Edgewood): Three miles west of Louisiana, Missouri.

GLADIOLITES VENOSUS Gurley. See *Retiolites geinitzianus venosus*.

GLAPHURUS Raymond.

Genotype: *Arionellus pustulatus* Walcott.

Glaphurus Raymond, *Annals Carnegie Mus.*, 3, 1905, p. 357.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 313.—Raymond, *Zittel-Eastman Textb. Pal.*, 1913, p. 723.

GLAPHURUS PRIMUS Raymond. See *Cybeloides primus*.

Glaphurus pustulatus (Walcott).

Arionellus pustulatus Walcott, 31st Ann. Rep. New York State Mus. Nat. Hist. 1879 (1880), (adv. sheets, 1877, p. 15), p. 68.

Sao(?) *Lamottensis* Whitfield, *Bull. Amer. Mus. Nat. Hist.*, 1, 1881, p. 334, pl. 3, figs. 9-11.—Brainerd and Seely, *Bull. Amer. Mus. Nat. Hist.*, 3, 1890, p. 22.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1889, p. 925, figs.

Agraulos (*Arionellus*) *pustulatus* Vogdes, *Bull. U. S. Geol. Surv.*, No. 63, 1890, p. 90.

Glaphurus pustulatus Raymond, *Ann. Carnegie Mus.*, 3, 1905, p. 357, pl. 14, figs. 4-6, fig. 3; *ibid.*, 7, 1910, p. 74, pl. 18, figs. 9-11; 7th Rep. Vermont State Geol. 1910, p. 234, pl. 36, figs. 4-6; pl. 38, figs. 9-11.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 313, figs. 1625, 1626.—Perkins, *Rep. Vermont State Geol.*, 8th ser., 1912, pl. 18, figs. 9-11.

Chazyan (Crown Point, Valcour): Valcour Island, Sloop Island, Chazy, and Coopersville, New York; Isle La Motte, Vermont.

GLASSIA Davidson.

Genotype: *Atrypa obovata* Sowerby

Glassia Davidson, *Geol. Mag.*, n. s., 8, 1881, p. 11; *Sup. British Dev. and Sil. Brach.*, *Pal. Soc.*, 1882, p. 38.—Davidson, *Mon. British Foss. Brach.*, 5, *Sil. Suppl.*, *Pal. Soc.*, 1882, pp. 86, 116.—Miller, *N. A. Geol. Pal.*, 1889, p. 346.—Hall and Clarke, *Pal. New York*, 8, pt. 2, 1893, p. 152, figs. 142-145; 13th Ann. Rep. New York State Geol., 1895, p. 811.—Koken, *Die Leitfossilien, Leipzig*, 1896, p. 238.—Schuchert, *Zittel-Eastman Textb. Pal.*, 1913, p. 409.

GLASSIA HEADI Miller. See *Catazyga headi*.

Glassia romingeri Hall and Clarke.

Glassia romingeri Hall and Clarke, *Pal. New York*, 8, pt. 2, 1893, p. 153, pl. 33, figs. 32-35; 48th Rep. New York State Mus., 2, for 1895, 1897, p. 363, pl. 1, figs. 33-36; 14th Rep. State Geol. New York for 1894, 1877, p. 363, pl. 9, figs. 33-36.

Trenton: Drift near Ann Arbor, Michigan.

GLASSIA SCHUCHERTANA Ulrich. See *Catazyga headi schuchertana*.

Glassia variabilis Whiteaves.

Glassia variabilis Whiteaves, *Geol. Surv. Canada, Ann. Rep.*, n. s., 14, App. F. 1894, p. 42; *Geol. Surv. Canada, Pal. Foss.*, 3, pt. 4, 1906, p. 252, pl. 26, figs. 6-6b; p. 273; pl. 26, figs. 3-5; p. 277, pl. 26, figs. 7-9.

Niagaran: Winisk, Ekwan, and Fawn rivers, Canada.

GLAUCOCRINUS Parks and Alcock.

Genotype: *G. falconeri* Parks and Alcock.

Glaucocrinus Parks and Alcock, *The Ottawa Nat.*, 26, 1912, p. 43.

Observation.—Probably a synonym for *Anomalocrinus*.

Glaucocrinus falconeri Parks and Alcock.

Glaucocrinus falconeri Parks and Alcock, *The Ottawa Nat.*, 26, 1912, p. 43, pl. 4, figs. 1, 4.

Trenton (Curdsville): Kirkfield, Ontario.

GLAUCONOME Goldfuss.Genotype: *G. disticha* Goldfuss.

Glaucanome Goldfuss, *Petrefacta Germaniæ*, 1826, p. 100.—Lonsdale, Murchison's *Sil. Syst.*, 1839, p. 677.—Phillips, *Pal. Foss. Cornwall, Devon, and W. Somerset*, 1841, p. 21.—Etheridge, *Ann. Mag. Nat. Hist.*, 4th ser., 20, 1877, p. 32.—McCoy, *Syn. Char. Carb. Foss. Ireland*, 1844, p. 198.—Vine, *Rep. 53d Meeting British Assoc. Adv. Sci.*, 1884, p. 204.—Shrubsole and Vine, *Quart. Jour. Geol. Soc. London*, 1884, 40, p. 329.—Goldfuss, *Petrefacta*, 2d ed., pt. 1, 1862, p. 94.—Vine, *Rep. 50th Meeting British Assoc. Adv. Sci.*, 1880, p. 82; *Geol. Mag.*, dec. 2, 7, 1880, p. 507; *Rep. 51st Meeting British Assoc. Adv. Sci.*, 1882, p. 170.—Bassler, *Bull. U. S. Nat. Mus.*, 77, 1911, pp. 159, 160; *Zittel-Eastman Textb. Pal.*, 1913, p. 343.

Penniretepora D'Orbigny, *Prodr. de Pal.*, 1, 1850, p. 45.—Zittel, *Handb. Pal.*, 1, 1880, p. 603.—Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 150.

Glaucanome strigosa (Billings).

Helopora strigosa Billings, *Catal. Sil. Foss. Anticosti*, 1866, p. 37.

Nematopora (?) *strigosa* Ulrich, *Amer. Geol.*, 1, 1888, p. 232, footnote; *Geol. Surv. Illinois*, 8, 1890, p. 645.

Glaucanome strigosa Bassler, *Bull. U. S. Nat. Mus.*, 77, 1911, pp. 161, 162, fig. 81. *Species No. 1*.—Wiman, *Bull., Geol. Inst. Univ. Upsala*, 5, pt. 2, 1902, p. 181, pl. 6, figs. 29–33.

Silurian: Island of Anticosti, Canada (Charleton, Ellis Bay); Borkholm, Esthonia, Russia (Borkholm).

GLOSSINA Phillips. See *Lingula* subgenus *Palæoglossa* Cockerell.**GLOSSINA ACUMINATA** Hall and Clarke. See *Lingulella* (*Lingulepis*) *acuminata* sequens.**GLOSSINA CYANE** Schuchert. See *Obolus cyane*.**GLOSSOCERAS** Barrande.Genotype: *G. gracile* Barrande.

Glossoceras Barrande, *Syst. Sil. du Centre Boheme*, 2, pt. 1, 1867, p. 372; *Cephalopodes: Ext. Syst. Sil. du Centre Boheme*, 1877, p. 118.—Hyatt, *Proc. Boston Soc. Nat. Hist.*, 22, 1884, p. 279.—Zittel, *Handb. Pal.*, 2, 1884, p. 373.—Foord, *Cat. Foss. Ceph. British Mus.*, 1, 1888, p. 253.—Lindstrom, *Kongl. Sven. Vet.-Akad. Handl.*, 23, No. 12, 1890, p. 33.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 49, fig. 32, fig. 2.—Hyatt, *Zittel-Eastman Textb. Pal.*, 1, 1900, p. 516; *ibid.*, 2d ed., 1913, p. 597.

Glossoceras desideratum Billings.

Glossoceras desideratum Billings, *Cat. Sil. Foss. Anticosti*, *Geol. Surv. Canada*, 1866, p. 60.

Anticostian (Jupiter River): Southwest Point, Anticosti.

GLOSSOGRAPTUS Emmons. See *Glossograptus* Emmons.**GLOSSOGRAPTUS** Emmons.Genotype: *G. ciliatus* Emmons.

Glossograptus Emmons, *Amer. Geology*, 1, pt. 2, 1855, p. 108.

Glossograptus Zittel, *Handb. Pal.*, 1, 1879, p. 302.—Miller, *N. A. Geol. Pal.*, 1889, p. 189.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 329.—Roemer and Frech, *Leth. geog.*, 1 Theil, *Leth. Pal.*, 1, 3 Lief. 1897, p. 631.—Elles and Wood, *Mon. British Grapt.*, *Pal. Soc.*, 1903, p. 38.—Ruedemann, *Mem. New York State Mus.*, 7, 1904, p. 724; *ibid.*, 11, pt. 2, 1908, pp. 375–379; *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 130.

Glossograptus arthracanthus Gurley.

Diplograptus ciliatus Emmons, Amer. Geology, 1, pt. 2, 1855, p. 106, pl. 1, fig. 11, Man. Geol., 1860, p. 87, fig. 65.

Glossograptus arthracanthus Gurley, Jour. Geol., 4, 1896, p. 78.

Normanskill or Early Trenton: Augusta County, Virginia.

Glossograptus ciliatus Emmons.

Glossograptus ciliatus Emmons, Amer. Geology, 1, pt. 2, 1856, p. 108, pl. 1, fig. 25.—Lapworth, Quart. Jour. Geol. Soc. London, 31, 1875, p. 659, pl. 34, fig. 7; Roy. Soc. Canada Trans., 5, 4th sec., 1887, p. 184; Canadian Geol. Surv. Rep., 2d ser., 3, pt. 1, 1889, p. 95B.—Ami, Geol. Surv. Canada Rep., 2d ser., 3, pt. 2, 1889, p. 117K.—Gurley, Geol. Surv. Ark., Ann. Rep., 3, 1892, p. 404f.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 379-383, pl. 26, figs. 1-5; pl. 27, figs. 1-4, figs. 324-335.

Diplograptus ciliatus Walcott, Alb. Inst. Trans., 10, 1881 (adv. sheets, 1879, p. 34).

Glossograptus setaceus Emmons, Amer. Geology, 1, 1856, p. 236, pl. 1, fig. 20.

Graptolithus spinulosus Hall, Pal. New York, 3, 1859, p. 517, fig.; New York State Cab. Nat. Hist., 13th Ann. Rep., 1860, p. 60, fig.

Glossograptus spinulosus Lapworth, Ann. Mag. Nat. Hist., 5, 1880, p. 283.—Dodge, Amer. Jour. Sci., 3d ser., 40, 1890, p. 153.

Diplograptus spinulosus Walcott, Trans. Alb. Inst., 10, 1881, p. 35; Bull. Geol. Soc., 1, 1890, p. 339.

Chazy (Normanskill): Glenmont and other localities in slate belt of New York; Alabama; Long Point, St. Anne River, Quebec; Kicking Horse Pass and Dease River, British Columbia; Arkansas; Maine; North Wales.

Glossograptus ciliatus debilis Ruedemann.

Glossograptus ciliatus var. *debilis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 384, pl. 26, figs. 6, 7.

Chazy (Normanskill): Mount Moreno, near Hudson, New York.

Glossograptus ciliatus horridus Ruedemann.

Glossograptus ciliatus Emmons mut. *horridus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 383, 384, pl. 26, figs. 8, 9; pl. 27, fig. 5.

Canadian: Summit, Nevada.

Holotype and *paratype*.—Cat. No. 54254, U.S.N.M.

GLOSSOGRAPTUS ECHINATUS Ruedemann. See *Glossograptus hystrix*.

GLOSSOGRAPTUS? EUCARIS Ruedemann. See *Lasiograptus* (*Thysanograptus*) *eucharis*.

Glossograptus hystrix Ruedemann.

Glossograptus sp. Ruedemann, New York State Pal., Ann. Rep., 1902, p. 571.

Glossograptus hystrix Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 724, 725, pl. 16, figs. 27-29, text fig. 101.

Glossograptus echinatus Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 725-726, pl. 16, figs. 30-32, fig. 102.

Canadian: Deepkill, Rensselaer County, and Mount Moreno, near Hudson, New York (Deepkill, *Diplograptus dentatus* zone); Arkansas.

Glossograptus (Orthograptus) quadrimucronatus (Hall).

Graptolites dentatus Vanuxem, Geol. New York, 3d Dist., 1842, p. 57, fig. 2.—Emmons, Geology New York, 2d Dist., 1842, p. 279, fig. 2.—Hall, *ibid.*, 4th Dist., 1843, p. 29.

Glossograptus (Orthograptus) quadrimucronatus—Continued.

Graptolithus pristis (in part) Hall, Pal. New York, 1, 1847, p. 265, pl. 57, figs. 1a-k.
Diplograptus pristis Ruedemann, Amer. Jour. Sci., 3d ser., 49, 1895, p. 453.—
 Wiman, Bull. Geol. Inst. Upsala, 5, 1895, p. 69.—Törnquist, Zool. Centralbl.
 4, 1897, p. 4.

Graptolithus quadrimucronatus Hall, Geol. Surv. Canada, Can. Org. Rem.,
 dec. 2, 1865, p. 144, pl. 13, figs. 1-10; New York State Cab. Nat. Hist., 20th
 Ann. Rep. 1868, pl. 3, figs. 1-5; rev. ed., 1870, p. 230; p. 224.—White, U. S.
 Geog. Surv. West 100th Merid., Wheeler's Rep., 4, Pal., 1877, p. 65, pl. 4,
 figs. 1a-b.—Walcott, Trans. Alb. Inst., 10 (adv. sheets, 1879, p. 35), 1881,
 p. 4 (loc. occ.).

Diplograptus quadrimucronatus Nicholson, Geol. Mag., 4, 1867, p. 111, pl. 7, figs.
 1-8.—Lapworth, Geol. Mag., 6, 1877, p. 133, pl. 6, fig. 20; Belfast Nat. Field
 Club, Rep. and Proc., 1, 1876, App. 1877, p. 133, pl. 6, fig. 20.—Linnarsson,
 Sver. Geol. Und., ser. C, No. 41, 1879, p. 18.—Lapworth, Ann. Mag. Nat.
 Hist., 5th ser., 5, 1880, p. 359.—Tullberg, Sver. Geol. Und., ser. C, No. 41,
 1880, p. 18; *ibid.*, No. 50, 1882, p. 18.—Ruedemann, Bull. New York State
 Mus., 42, 1901, p. 528.

Diplograptus (Orthograptus) quadrimucronatus T. S. Hall, Geol. Surv. Victoria
 Rec., 1, pt. 4, 1906, p. 275, pl. 34, figs. 10, 11.

Orthograptus quadrimucronatus Ami, Can. Rec. Sci., 1893, 5, pp. 180, 234; Geol.
 Surv. Canada, Summ. Rep., 1904, 1905, p. 12.—Roemer and Frech, Leth.
 geog., 1 Theil, Leth. Pal., 1, 3 Lief., 1897, p. 633.

Glossograptus (Orthograptus) quadrimucronatus Ruedemann, Mem. New York
 State Mus., 2, pt. 2, 1908, pp. 385-392, fig. 336 (see pl. 26, figs. 10-15; pl. 27,
 figs. 6, 7).

Orthograptus amii Lapworth, Can. Surv. Ann. Rep., 1887, pp. 15K, 24K.

Diplograptus foliaceus (in part) Ruedemann, New York State Geol. Ann. Rep.
 for 1894, 1895, pl. 1, figs. 1, 5, 8, 9; pl. 2, fig. 6; pl. 3, figs. 1-26; Amer. Nat.,
 32, 1898, p. 6; Mem. New York State Mus., 7, 1904, p. 528, fig. 9.

Diplograptus aff. whitfieldi Roemer and Frech, Leth. Pal., 1, 1897, pl. A, figs.
 1b, 1c.

Trenton: Lake St. John, Quebec, Montreal, north shore Lake Huron and Ottawa
 (Collingwood), and in belt girdling the Adirondacks; Great Britain (Hartfell);
 Scandinavia; Australia.

Pleriotype.—Cat. No. 8557, U.S.N.M.

Glossograptus (Orthograptus) quadrimucronatus approximatus Ruedemann.

Glossograptus quadrimucronatus var. *approximatus* Ruedemann, Mem. New York
 State Mus., 11, pt. 2, 1908, pp. 392, 393, pl. 26, figs. 10-15; pl. 27, figs. 6, 7,
 fig. 337.

Trenton (Canajoharie): Dolgeville, Mechanicsville, etc., New York.

Glossograptus (Orthograptus) quadrimucronatus cornutus Ruedemann.

Glossograptus quadrimucronatus var. *cornutus* Ruedemann, Mem. New York
 State Mus., 11, pt. 2, 1908, pp. 393, 394, pl. 27, figs. 8-10, figs. 338-342.

Trenton (Canajoharie): Rural cemetery, Albany, New York.

Glossograptus (Orthograptus) quadrimucronatus postremus Ruedemann.

Glossograptus quadrimucronatus mut. *postremus* Ruedemann, Mem. New York
 State Mus., 11, pt. 2, 1908, p. 394, pl. 26, fig. 16, fig. 343.

Trenton (Canajoharie): Waterford, Frankfort, etc., New York.

GLOSSOGRAPTUS SETACEUS Emmons. See *Glossograptus ciliatus*.

GLOSSOGRAPTUS SPINULOSUS Lapworth. See *Glossograptus ciliatus*.

Glossograptus whitfieldi (Hall).

Graptolithus whitfieldi Hall, Pal. New York, 3, 1859, p. 516, fig. 1; New York State Cab. Nat. Hist., 13th Rep., 1860, p. 60, fig. 1; Geol. Surv. Canada, Can. Org. Rem., dec. 2, 1865, p. 31, fig. 29; p. 36, fig. 31; non pl. B, figs. 6-11; New York State Cab. Nat. Hist., 20th Rep., 1868, p. 199, fig. 31; p. 205, fig. 33; pl. 1, figs. 6-11; pp. 230, 236, 224.

Diplograptus whitfieldi Nicholson, Geol. Mag., 4, 1867, 111, pl. 7, figs. 4, 4a.

Diplograptus whitfieldi Nicholson, Mon. British Grapt., 1872, p. 54, fig. 23; p. 69, fig. 30b.—Lapworth, Cat. West. Scott. Foss., 1876, pl. 2, fig. 45; Belfast Field Club Ann. Rep. Proc., 2d ser., App., 1, pt. 4, p. 134, pl. 6, fig. 21.—Zittel Handb. Pal., 1, 1879, p. 294, fig. 200.—Lapworth, Ann. Mag. Nat. Hist., 56 ser., 6, 1880, p. 21.—Walcott, Trans. Alb. Inst., 1883, 10 (adv. sheet, 1879, p. 35).—Lapworth, Roy. Soc. Can. Proc., Trans., 4, 1886, 184.—Ami, Geol. Surv. Can. Rep., ser. 2, 3, pt. 2, 1889, p. 117K.—Geinitz, Mitth. K. Min. Geol. praeh., Mus. Dresden, 9, 1890, 35, pl. A, fig. 52.—Gurley, Geol. Surv. Arkansas, Rep., 3, 1890, p. 411.—Walcott, Geol. Soc. Am. Bull., 1, 1890, 339.—James, Jour. Cincinnati Soc. Nat. Hist., 14, pt. 2, 1892, p. 158.—Frech, Leth. Geog., 1, Theil. Leth. Pal., 1, 1897, p. 631, not fig. 192.—Ruedemann, Bull. New York State Mus., 42, 1901, pp. 497, 541.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 34.—Hoek, Neues Jahrb. Min. Geol. Pal., 14, 1912, p. 233, pl. 13, figs. 2, 3.

Diplograptus (*Graptolithus*) *whitfieldi* Leasley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 208, figs.

Glossograptus whitfieldi Ruedemann, Mem. New York State Mus., 11, pt. 2, 1906, pp. 394-397, pl. 26, fig. 17, figs. 344, 345.

Chazy: Normanskill, Glenmont, Stockport, etc., New York; Canada; Arkansas (Normanskill); Great Britain (Glenkiln); Bolivia.

GLYCERITES Hinde.

Genotype: *G. sulcatus* Hinde.

Glycerites Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 380.—Miller, N. A. Geol. Pal., 1889, p. 518.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 243.

Glycerites calceolus Hinde.

Glycerites calceolus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 384, pl. 20, fig. 11.

Upper Medinan (Cataract): Toronto, Ontario.

Glycerites sulcatus Hinde.

Glycerites sulcatus Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 380, pl. 19, fig. 1.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 243, fig. 152a. Cincinnati (Pulaski): Toronto, Ontario.

Glycerites sulcatus excavatus Hinde.

Glycerites sulcatus var. *excavatus*, Hinde, Quart. Jour. Geol. Soc. London, 35, 1879, p. 380, pl. 19, fig. 10.

Cincinnati (Pulaski): Toronto, Ontario.

GLYPTASTER Hall. See *Dimerocrinus* Phillips.

GLYPTASTER (**EUCRINUS**) **ANGULARIS** Wachsmuth and Springer. See *Ptychocrinus parvus*.

GLYPTASTER ARMOSUS Wachsmuth and Springer. See *Siphonocrinus armosus*.

GLYPTASTER OCCIDENTALLIS var. **CREBESCENS** Hall. See *Dimerocrinus occidentalis*.

GLYPTOCERAS Foerste. See *Cyrtoceras* Goldfuss.

GLYPTOCRINITES Carpenter. See *Glyptocrinus* Hall.

GLYPTOCRINUS Hall.

Genotype: *G. decadactylus* Hall.

Glyptocrinus Hall, Pal. New York, 1, 1847, p. 281.—McCoy, British Pal. Rocks, Foss., 1854, p. 56.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 223.—Billings, Canadian Nat. Geol., 1, 1856, p. 53; Geol. Surv. Canada, Rep. Progr., 1853-1856, 1857, p. 256; Geol. Surv. Canada, dec. 4, 1859, p. 55, fig. 18.—Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 372.—Zittel, Handb. Pal., 1, 1879, p. 374.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 30.—Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1880, p. 246.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 356 (Rev. Pal., pt. 2, p. 182); *ibid.*, 1885, p. 324; *ibid.*, 1887, p. 105; *ibid.*, 1890, p. 353.—Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 259.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 217-219, 226.—Wachsmuth and Springer, Amer. Jour. Sci., 3d ser., 25, 1883, p. 255.—Carpenter, Phil. Trans. Royal Soc. London, 174, 1884, p. 929.—Miller, N. A. Geol. Pal., 1889, p. 247.—Dyche, Science, 20, 1892, p. 66.—James, Jour. Cincinnati Soc. Nat. Hist., 19, 1897, pp. 110, 111.—Bather, Treatise on Zool., 1897, p. 161.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 147.—Zittel, Grundzuge Pal., 1, 1910, p. 162.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 712.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 552.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 189.

Reteocrinus (part) Wachsmuth and Springer, Amer. Jour. Sci., 25, 1883, p. 266.

Canistrocrinus Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1885, pp. 310, 316 (Rev. Pal., 3, sec. 1, pp. 88, 94).—James, Jour. Cincinnati Soc. Nat. Hist., 19, 1897, pp. 104, 105.—Zittel, Grundzuge Pal., 1, 1910, p. 161.

Glyptocrinites Carpenter, Phil. Trans. Royal Soc. London, 174, 1884, p. 929.

GLYPTOCRINUS ANGULARIS Miller and Dyer. See *Ptychocrinus parvus*.

GLYPTOCRINUS ARGUTUS Walcott. See *Stelidiocrinus argutus*.

GLYPTOCRINUS ARMOSA Hall. See *Siphonocrinus armosus*.

GLYPTOCRINUS (EUCALYPTOCRINUS) ARMOSUS McChesney. See *Siphonocrinus armosus*.

GLYPTOCRINUS BAERI Meek. See *Xenocrinus baeri*.

GLYPTOCRINUS BILLINGSI Miller. See *Periglyptocrinus billingsi*.

GLYPTOCRINUS CARLEYI Hall. See *Mariocrinus carleyi*.

Glyptocrinus circumcarinatus Parks and Alcock.

Glyptocrinus circumcarinatus Parks and Alcock, The Ottawa Nat., 26, 1912, p. 45, pl. 4, figs. 2, 3.

Trenton (Curdsville): Kirkfield, Ontario.

GLYPTOCRINUS COGNATUS Miller. See *Reteocrinus nealli*.

Glyptocrinus decadactylus Hall.

Glyptocrinus decadactylus Hall, Pal. New York, 1, 1847, p. 281, pl. 77, figs. 1a-f; pl. 78, figs. 1a-u.—Christy, Letters on Geol., 1848, pl. 1, fig. 10.—Yandell, Proc. Amer. Assoc. Adv. Sci., 5, 1851, p. 234.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 821, fig. 622.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1860, p. 69.—Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p.

Glyptocrinus decadactylus—Continued.

- 207, fig. 2.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 30, pl. 2, figs. 5a, b.—Zittel, Handb. Pal., 1, 1879, p. 375, fig. 262.—Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 260, fig. 2.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 220, pl. 11, figs. 1a-c.—Roemer, Leth. Geog., 1 Teil, Leth. Pal., Atlas, 1883, pl. 3, fig. 19.—Leasey, Geol. Surv. Pennsylvania, Rep. P., 1889, p. 254, fig.—Miller, N. A. Geol. Pal., 1889, p. 247, figs. 313-315.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 270, pl. 2, figs. 4a-e; pl. 21, figs. 4a-b.—James, Jour. Cincinnati Soc. Nat. Hist., 19, 1897, p. 111.—Bather, Geol. Mag., dec. 4, 6, 1899, p. 32, fig. 1; Treatise on Zool. pt. 3, Echinodermata, London, 1900, p. 119, fig. 25.—Hayes and Ulrich, U. S. Geol. Surv., folio 95, illus. sheet, 1903, fig. 16.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 720, pl. 4, fig. 9.—Grabau and Shiner, N. A. Index Fossils, 2, 1910, p. 552, figs. 1882, 1883.
- Heterocrinus decadactylus* Emmons, Amer. Geology, 1, pt. 2, 1855, p. 223.
- Apiocrinite*(?) Anthony, Amer. Jour. Sci. Arts, 35, 1839, p. 360, text fig.
- Maysville (Fairmount): Cincinnati, Ohio, and vicinity; Indiana; Kentucky.
- Plesiotype*.—Cat. Nos. 35409, 40768, etc., U.S.N.M.

Glyptocrinus dyeri Meek.

- Glyptocrinus dyeri* Meek, Proc. Acad. Nat. Sci. Philadelphia, 1872, p. 314; Geol. Surv. Ohio, Pal., 1, 1873, p. 32, pl. 2, figs. 2a, b.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 222.—Dyche, *ibid.*, 15, 1892, p. 101; Science, 20, 1892, p. 66; Amer. Geol., 10, 1892, p. 130.—James, Jour. Cincinnati Soc. Nat. Hist., 19, 1897, p. 112.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 271, pl. 20, figs. 1a-c; pl. 21, figs. 3a-c, fig. 6.—Springer, Mem. Mus. Comp. Zool., Harvard, 25, No. 2, 1905, pl. 1, fig. 13.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 722, pl. 4, fig. 8.
- Maysville (Corryville): Cincinnati, Ohio, and vicinity.
- Plesiotype*.—Cat. No. 40762, 40767, U.S.N.M.

Glyptocrinus dyeri sublaevis Miller.

- Glyptocrinus dyeri* var. *sublaevis* Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1871, p. 103, pl. 3, fig. 2; *ibid.*, 1883, 7, p. 217.
- Maysville (Corryville): Cincinnati, Ohio, and vicinity.

GLYPTOCRINUS DYERI var. **SUBGLOBOSUS** Meek. See *Glyptocrinus subglobosus*.**Glyptocrinus? fimbriatus** Shumard.

- Glyptocrinus fimbriatus* Shumard, 1st-2d Ann. Rep. Geol. Surv. Missouri, pt. 1, 1855, p. 194, pl. A, fig. 10a, b.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 227.

Upper Medinan (Girardeau): Cape Girardeau County, Missouri.

Glyptocrinus? fornshelli Miller.

- Glyptocrinus fornshelli* Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 348, fig. 41; *ibid.*, 6, 1883, p. 227; N. A. Geol., Pal., 1889, p. 248, fig. 316.—Key, Missouri Geol. Surv., 4, 1894, p. 162.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 276, pl. 20, fig. 3; pl. 21, fig. 5.—James, Jour. Cincinnati Soc. Nat. Hist., 19, 1897, p. 114.
- Richmond (Waynesville): Near Morrow, Ohio.
- Plesiotype*.—Cat. No. 40771, U.S.N.M.

GLYPTOCRINUS HARRISI Miller. See *Compsocrinus harrisi*.

Glyptocrinus insperatus Rowley.

Glyptocrinus insperatus Rowley, Amer. Geol., 34, 1904, p. 275, pl. 16, figs. 34, 42, 43.

Upper Medinan (Edgewood): Near Edgewood, Pike County, Missouri.

Glyptocrinus insperatus carinatus Rowley.

Glyptocrinus insperatus? var. *carinatus* Rowley, Amer. Geol., 34, 1904, p. 278, pl. 16, fig. 56.

Upper Medinan (Edgewood): Near Edgewood, Pike County, Missouri.

Glyptocrinus insperatus pentagonus Rowley.

Glyptocrinus insperatus var. *pentagonus* Rowley, Amer. Geol., 34, 1904, p. 276, pl. 16, figs. 35, 36.

Upper Medinan (Edgewood): Near Edgewood, Pike County, Missouri.

GLYPTOCRINUS LACUNOSUS Billings. See *Archæocrinus lacunosus*.**Glyptocrinus libanus** Safford.

Glyptocrinus Libanus Safford, Geol. Tennessee, 1869, p. 286 (nom. nud.).

Stones River: Lebanon, Tennessee.

GLYPTOCRINUS MARGINATUS Billings. See *Archæocrinus marginatus*.**Glyptocrinus mercerensis** Miller and Gurley.

Glyptocrinus mercerensis Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 28, pl. 2, fig. 23.

Trenton (Curdsville): Mercer County, Kentucky.

GLYPTOCRINUS MIAMIENSIS Miller. See *Compsocrinus miamiensis*.**GLYPTOCRINUS NEALLI** Hall. See *Reteocrinus nealli*.**GLYPTOCRINUS NOBILIS** Hall. See *Siphonocrinus nobilis*.**Glyptocrinus ornatus** Billings.

Glyptocrinus ornatus Billings, Geol. Surv. Canada, Rep. Progress for 1853-56, 1857, p. 260; Geol. Surv. Canada, dec. 4, 1859, p. 60, pl. 9, fig. 2a, b.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 225.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 274, pl. 20, fig. 6a, b.—Springer, Geol. Surv. Canada, Mem. 15P, 1911, p. 11 (loc. occ.).

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

GLYPTOCRINUS PARVUS Hall. See *Ptychocrinus parvus*.**Glyptocrinus? pattersoni** Miller.

Glyptocrinus pattersoni Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 80, pl. 3, fig. 2, 2a; *ibid.*, 6, 1883, p. 226.

Reteocrinus Pattersoni Wachsmuth and Springer, Amer. Jour. Sci. Arts, 25, 1883, p. 266.

Canistrocrinus Pattersoni Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1885, p. 317 (Rev. Pal., pt. 3, sec. 1, p. 95.).—James, Jour. Cincinnati Soc. Nat. Hist., 19, 1897, p. 105.

Eden (Economy): Ohio River bank opposite Cincinnati, Ohio.

Glyptocrinus plumosus (Hall).

Actinocrinus? plumosus Hall, Nat. Hist. New York Geol., 4, 1843, p. 72.—Owen, Amer. Jour. Sci. Arts, 48, 1845, p. 303, fig. 5.

Glyptocrinus plumosus—Continued.

Glyptocrinus plumosus Hall, Pal. New York, 2, 1852, p. 180, pl. 41A, figs. 2-4—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 157, fig. 52; Bull. New York State Mus., 45, p. 157, fig. 52.

Lower Clinton: Near Medina, Reynale's Basin, and Lockport, New York.

GLYPTOCRINUS PRISCUS Billings. See *Periglyptocrinus priscus*.

Glyptocrinus quinquepartitus Billings.

Glyptocrinus quinquepartitus Billings, Geol. Surv. Canada, dec. 4, 1859, pl. 1, figs. 4a, 4b.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 217.

Trenton: Ottawa, Ontario.

Glyptocrinus ramulosus Billings.

Glyptocrinus ramulosus Billings, Canadian Nat. Geol., 1, 1857, p. 49, fig. 1; p. 54, fig. 3; p. 55, figs. 4-8; Canadian Jour., n. s., 1, 1856, p. 165; Geol. Surv. Canada, Rep. Progr. for 1853-1856, p. 258; Geol. Surv. Canada, dec. 4, p. 5, pl. 7, figs. 2a-f; pl. 8, figs. 1a-e.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 224.—Wachsmuth and Springer, Mem. Mus. Comp. Zool. Harvard, 20, 1897, p. 273, pl. 20, fig. 5a-b.—Grabau and Shimer, N. A. Index Foss., 2, 1910, p. 552.—Springer, Mem. Geol. Surv. Canada, 15 P, 1911, p. 11 (loc. occ.).

Archæocrinus? *ramulosus* Wachsmuth and Springer, Amer. Jour. Sci., 3d ser., 3, 1883, p. 265.

Trenton (Curdsville): Ottawa and Kirkfield, Ontario; Mercer County, Kentucky.

Glyptocrinus? richardsoni Wetherby.

Glyptocrinus richardsoni Wetherby, Jour. Cincinnati Soc. Nat. Hist., 2, 1881, p. 245, pl. 16, fig. 1, 1a.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 227.

Reteocrinus richardsoni Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 367 (Rev. Pal., pt. 2, p. 193).

Canistocrinus richardsoni Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1885, p. 317 (Rev. Pal., pt. 3, sec. 1, p. 95).—James, Jour. Cincinnati Soc. Nat. Hist., 19, 1897, p. 106.

Richmond: Wilmington, Ohio.

GLYPTOCRINUS SCULPTUS James. See *Rhaphanocrinus sculptus*.

GLYPTOCRINUS SHAFFERI Miller. See *Pycnocrinus shafferi*.

GLYPTOCRINUS SHAFFERI var. **GERMANUS** Miller. See *Pycnocrinus germanus*.

GLYPTOCRINUS SIPHONATUS Hall. See *Siphonocrinus armosus*.

Glyptocrinus subglobosus (Meek).

Glyptocrinus Dyeri var. *subglobosus* Meek, Proc. Acad. Nat. Sci. Philadelphia, 1872, p. 316; Geol. Surv. Ohio, Pal., 1, 1873, p. 34, pl. 2, fig. 2c.

Glyptocrinus subglobosus Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 7.—Miller, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 223.—James, Jour. Cincinnati Soc. Nat. Hist., 19, 1897, p. 114.

Reteocrinus subglobosus Wachsmuth and Springer, Amer. Jour. Sci., 3d ser., 3, 1883, p. 265.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

GLYPTOCRINUS? SUBNODOSUS Walcott. See *Rhaphanocrinus subnodosus*.

GLYPTOCRINUS TYPUS Miller. See *Tanaocrinus typus*.

GLYPTOCYSTIS Angelin. See *Cheirocrinus* Eichwald.

GLYPTOCYSTIS Bather (part). See *Glyptocystites* Billings.

GLYPTOCYSTIS LOGANI Springer. See *Cheirocrinus* logani.

GLYPTOCYSTIS MULTIPORUS Bather. See *Glyptocystites* multiporus.

GLYPTOCYSTITES Billings. Genotype: *G. multiporus* Billings.

Glyptocystites (part) Billings, Canadian Jour., 2, 1854, p. 215; Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 280.—Chapman, Canadian Jour., n. s., 2, 1857, p. 308.—Billings, Geol. Surv. Canada, dec. 3, 1858, p. 53.—Hall, Pal. New York, 3, 1859, p. 151.—Chapman, Expos. Min. Geol. Canada, 1864, p. 109.—Miller, N. A., Geol. Pal., 1889, p. 248.—Jaekel, Stammes. Pelmat. 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 275.—Grabau and Shimer (part), N. A. Index Fossils, 2, 1910, p. 463.

Glyptocystis Bather (part), Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 64, fig. 33; Trans. Roy. Soc. Edinburgh, 49, pt. 2, 1913, p. 430.

GLYPTOCYSTITES Billings (part). See *Cheirocrinus* Eichwald.

GLYPTOCYSTITES GRACILIS Shumard. See *Cheirocrinus* logani gracilis.

Glyptocystites multiporus Billings.

Glyptocystites multipora Billings, Canadian Jour., 2, 1854, p. 216, figs. 1-8; Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 281; *ibid.*, dec. 3, 1858, p. 54, pl. 3, fig. 1a, 1c.—Chapman, Expos. Min. Geol. Canada, 1864, p. 109.—Miller, N. A. Geol. Pal., 1889, p. 249, fig. 317.—Jaekel, Stammes. d. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 275, fig. 57, p. 277, pl. 15, fig. 4.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 463, fig. 1770.

Callocystis multipora Haeckel, Amphor. u. Cystoideen, 1896, p. 132, pl. 3, figs. 18-20.

Glyptocystis multiporus Bather, Treatise on Zool., pt. 3, Echinoderma, 1900, p. 64, fig. 33.—Springer, Mem. Geol. Surv. Canada, 15 P, 1911, p. 45 (loc. occ.).—Bather, Trans. Roy. Soc. Edinburgh, 49, pt. 2, 1913, p. 430, fig.

Trenton (Curdsville): Ottawa and Kirkfield, Ontario.

GLYPTODENDRON Clappole. See *Cyrtoceras* Goldfuss.

GLYPTOGRAPTUS Lapworth. See *Diplograptus* McCoy.

GLYPTORTHIS Foerste. See *Hebertella* subgenus *Glyptorthis*.

GNORIMOCRINUS Wachsmuth and Springer.

Genotype: *Taxocrinus expansus* Angelin.

Gnorimocrinus Wachsmuth and Springer, Proc. Nat. Acad. Philadelphia, Rev. Pal., 1, 1879, p. 50.—Bather, Rep. British Assoc. Adv. Sci., 1899, p. 922; Lankester's Treatise on Zool., 3, 1900, p. 189.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 163.—Springer, Jour. Geol., 14, 1906, p. 515; Mono. Crin. Flex., Smiths. Inst. (in press); Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 205.

Gnorimocrinus cirrifer Springer.

Gnorimocrinus cirrifer Springer, Mono. Crin. Flex., Smiths. Inst. (in press).
Niagaran (Brownport): Decaturville, Tennessee.

Gnorimocrinus varians Springer.

Gnorimocrinus varians Springer, Mono. Crin. Flex., Smiths. Inst. (in press).
Niagaran (Brownport): Decatur County, Tennessee.

GOLDIUS Dekoninck.Genotype: *Brontes flabellifer* Goldfuss.

Brontes Goldfuss (not Fabricius), *Beit. Petrefact.*, *Nova Acta Physico-Med.*, 12, 1839, p. 360.—Portlock, *Rep. Geol. Londonderry*, 1843, p. 268.

Goldius Dekoninck, *Mem. Acad. Sci. Bruxelles*, 14, 1841, p. 5.—Oehlert, *Bull. Soc. d'Etudes Sci. d'Angers*, 1885, p. 1.—Raymond, *Zittel-Eastman Textb. Pal.*, 1913, p. 720.

Bronteus Goldfuss, *Neues Jahrb. f. Min., etc.*, 1843, pp. 540, 548.—Burmester, *Org. der Tril.*, Berlin, 1843, p. 75.—Emmrich, *Neues Jahrb. f. Min., etc.*, 1845, p. 42.—Beyrich, *Ueber einige bohmische Trilobiten*, 1845, p. 33.—Hawle and Corda, *Abh. d. k. bohmischen Gesell. d. Wiss.*, 5 (extract), 1847, p. 56, pl. 4, figs. 33, 34.—Barrande, *Neues Jahrb. f. Min., etc.*, 1850, p. 777; *Syst. Sil. du Centre Boheme*, 1, 1852, p. 829.—McCoy, *British Pal. Rocks Fossils*, 1854, p. 179.—Pictet, *Traite de Pal.*, 2d ed., 2, 1854, p. 524.—Nieszkowski, *Archiv. f. Naturk. Liv.-, Ehst- u. Kurl.*, 1, 1857, p. 586.—Angelin, *Pal. Scandinavia*, 3d ed., *Holmiae*, 1878, p. 56.—Kayser, *Zeits. d. d. geol. Gesell.*, 31, 1879, p. 413.—Zittel, *Handb. Pal.*, 2, 1885, p. 613.—Hall and Clarke, *Pal. New York*, 7, 1888, p. 25, text fig. p. 26.—Miller, *N. A. Geol. Pal.*, 1889, p. 535.—Whitborne, *Mon. Dev. Fauna South England*, 1, *Pal. Soc.*, 1889, p. 32.—Clarke, *Geol. Minnesota*, 3, pt. 2, 1894, p. 726.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 28, fig. 18.—Beecher, *Amer. Jour. Sci.*, 4th ser., 3, 1897, p. 104, pl. 3, fig. 21.—Clarke, 15th Ann. Rep. New York State Geol., 1898, p. 736.—Grabau, *Bull. New York State Mus.*, 45, 1901, p. 226; *Bull. Buffalo Soc. Nat. Sci.*, 7, 1901, p. 226.—Lindstrom, *Kongl. Sven. Vet.-Akad. Handl.*, 34, 1901, pp. 26, 43.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 306.—Raymond, *Zittel-Eastman Textb. Pal.*, 1913, p. 720.

***Goldius acamas* (Hall).**

Bronteus acamas Hall, *Adv. Sheets*, 18th Rep. New York State Cab. Nat. Hist., 1865, p. 28; 20th Rep. New York State Cab. Nat. Hist., 1867, p. 322, pl. 21, figs. 19–20, p. 393; rev. ed., 1870, p. 422, pl. 21, figs. 19–20, pl. 25, fig. 21.—Weller, *Bull. Chicago Acad. Sci., Nat. Hist. Surv.*, 4, pt. 2, 1907, p. 23, pl. 20, fig. 1.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 306.

Niagaran (Racine): Racine, Wisconsin; Bridgeport and Romeo, Illinois.

***Goldius aquilonaris* (Whiteaves).**

Bronteus aquilonaris Whiteaves, *Geol. Surv. Canada, Ann. Rep.*, n. s., 14, App. F, 1904, p. 58; *Geol. Surv. Canada, Pal. Foss.*, 3, pt. 4, 1906, p. 267, pl. 42, fig. 2.

Niagaran: Ekwon River, Canada.

***Goldius ekwanensis* (Whiteaves).**

Bronteus Ekwanensis Whiteaves, *Geol. Surv. Canada, Ann. Rep.*, n. s., 14, App. F, 1904, p. 58; *Geol. Surv. Canada, Pal. Foss.*, 3, pt. 4, 1906, p. 266, pl. 42, fig. 1.

Niagaran: Ekwon River, Canada.

***Goldius flabellifer* (Goldfuss).**

Brontes flabellifer Goldfuss, *Nova Acta Acad. Caes. Leop. Nat.-Cur.*, 19, pt. 1, 1839, p. 361, pl. 33, fig. 3.

Bronteus flabellifer Philips, *Pal. Foss. Dev. and Cornw.*, 1841, p. 131, pl. 57, fig. 254.—Etheridge, *Quart. Jour. Geol. Soc. London*, 34, 1878, p. 590.

Niagaran: Bessels Bay, Arctic America.

***Goldius insularis* (Billings).**

Bronteus insularis Billings, *Cat. Sil. Foss. Anticosti*, *Geol. Surv. Canada*, 1866, p. 66.

Anticostian (Chicotte): Southwest Point, Anticosti.

Goldius laphami (Whitfield).

- Bronteus laphami* Whitfield, Ann. Rep. Wisconsin Geol. Surv. for 1877, 1878, p. 88; Geol. Surv. Wisconsin, 4, 1882, p. 310, pl. 22, figs. 1-4.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 195, fig.
Niagaran (Racine): Kewaunee, Wisconsin.

Goldius lunatus (Billings).

- Bronteus lunatus* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 338; Geol. Canada, Geol. Surv. Canada, 1863, p. 188, fig. 187.—Miller, N. A. Geol. Pal., 1889, p. 535, fig. 980.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 725, fig. 43.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 235.—Ruedemann, Bull. New York State Mus., 49, p. 65, pl. 4, figs. 10, 11.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 198, pl. 15, figs. 14-16.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 306, fig. 1017.
Trenton: Ottawa, Canada; Wykoff, Minnesota; Lake Winnipeg; Jacksonburg, New Jersey.

Goldius niagarensis (Hall).

- Bronteus? niagarensis* Hall, Pal. New York, 2, 1852, p. 314, pl. 70, fig. 3.—Grabau, Bull. New York State Mus., 45, 1901, p. 226, fig. 158.
Clinton (Irondequoit—Rochester): Niagara Falls, Ontario.

Goldius occasus (Winchell and Marcy).

- Bronteus occasus* Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 104, pl. 3, fig. 12.
Niagaran (Racine): Bridgeport, Illinois.

GOMPHOCERAS Sowerby.Genotype: *Orthoceras pyriforme* Sowerby.

- Gomphoceras* Sowerby in Murchison's Sil. Syst., 1839, p. 621.—Portlock, Rep. Geol. Londonderry, 1843, p. 381.—D'Orbigny, Prodr. de Pal., 1, 1849, pp. 3, 27.—Woodward, Man. Mollusca, pt. 1, 1851, p. 89, fig. 51 on p. 90.—Barrande, Neues Jahrb. f. Min., etc., 1854, p. 10, pl. 1, fig. 9a.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 644.—Emmons, Amer. Geology, 1, pt. 2, 1855, pp. 148, 151.—Barrande, Neues Jahrb. f. Min., etc., 1855, p. 258, pl. 3, fig. 14; Bull. Soc. Geol. France, 2d ser., 12, 1855, p. 158.—Billings, Canadian Nat. Geol., 2, 1857, p. 136, pl. 2, fig. 1.—Barrande, Neues Jahrb. f. Min., etc., 1860, p. 653; Syst. Sil. du Centre Boheme, 2, pt. 1, 1867, p. 243.—Hall, Pal. New York, 5, pt. 2, 1879, p. 318.—Koninck, Ann. d. Mus. Royal d'Hist. Nat. de Belgique, 5, 1880, p. 40.—Blake, Mon. British Foss. Cephalopoda, 1882, p. 58.—Zittel, Handb. Pal., 2, 1884, p. 370.—Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 277.—Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 470.—Miller, N. A. Geol. Pal., 1889, p. 437.—Whidborne, Mon. Dev. Fauna South England, 1, Pal. Soc., 1890, p. 117.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 211.—Koken, Die Leitfossilien, Leipzig, 1896, p. 47, text fig. 31.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 291.—Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 532; *ibid.*, 2d ed., 1913, p. 612.—Grabau, Bull. New York State Mus., 45, 1901, p. 216; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 216.—Jaekel, Zeits. d. d. geol. Gesell., 44, 1902, Protok., pp. 8, 68, 80.—Jaekel in Ruedemann, Amer. Geol., 31, 1903, p. 200.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1026.

GOMPHOCERAS ANGUSTUM Newell. See *Phragmoceras angustum*.*GOMPHOCERAS CASSINENSE* Whitfield. See *Cyclostomiceras cassinense*.

Gomphoceras cincinnatiense Miller.

Gomphoceras cincinnatiense Miller, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, 19, pl. 4, figs. 1, 1a.

Maysville (Corryville): Cincinnati, Ohio.

GOMPHOCERAS CONOIDEUM Whitfield and Hovey. See *Discoecorus conoides*.**Gomphoceras eos** Hall and Whitfield.

Gomphoceras eos Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 108, pl. fig. 5.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 244.

Richmond: Near Dayton, Ohio.

Gomphoceras faberi Miller.

Gomphoceras faberi Miller, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 19, pl. figs. 2, 2a.—James, J. F., *ibid.*, 8, 1886, p. 244.

Maysville (Corryville): Cincinnati, Ohio.

GOMPHOCERAS HALLI D'Orbigny. See *Orthoceras fusiforme*.**GOMPHOCERAS HERTZERI** Miller. See *Hexameroceras hertzeri*.**Gomphoceras indianense** Miller and Faber.

Gomphoceras indianense Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 11, 1894, p. 137, pl. 7, figs. 3-5.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. La Indiana, 1908, p. 1030, pl. 49, figs. 4-4b.

Richmond: Near Versailles, and Madison, Indiana.

Gomphoceras lineare Newell.

Gomphoceras linearis Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, pp. 474, fig.

Niagaran: Bridges quarry, Wabash, Indiana.

GOMPHOCERAS MARCYÆ Winchell and Marcy. See *Gomphoceras scrinium*.**GOMPHOCERAS MINIMUM** Whitfield. See *Cyclostomiceras minimum*.**GOMPHOCERAS MIRUM** Barrande. See *Pentameroceras mirum*.**GOMPHOCERAS NESTOR** Foord. See *Phragmoceras nestor*.**GOMPHOCERAS OBESUM** Billings. See *Poterioceras obesum*.**Gomphoceras ortonii** Foerste.

Gomphoceras Ortoni Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 533, pl. 33, figs. 8a, b; pl. 36, figs. 7a-c.

Upper Medinan (Brassfield): Browns quarry, near Dayton, Ohio.

Gomphoceras parvulum Whiteaves.

Gomphoceras parvulum Whiteaves, Canadian Rec. Sci., 4, 1891, p. 296, pl. 1, figs. 5, 5a, b; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 296, pl. 5, figs. 2, 2a, 2b.

Niagaran: Grand Rapids of Saskatchewan, Canada.

Gomphoceras powersi J. F. James.

Gomphoceras powersi James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 25, pl. 4, fig. 2.—Ulrich, Amer. Geol., 1, 1898, p. 325.

Black River (Platteville): Beloit, Wisconsin.

Gomphoceras projectum Newell.

Gomphoceras projectum Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, pp. 474, figs.

Niagaran: Delphi, Indiana.

Gomphoceras scrinium Hall.

Gomphoceras scrinium Hall, 20th Rep. New York State Cab. Nat. Hist. (extras, 1865), 1868, p. 350, pl. 18(9), figs. 1-3; pp. 389, 393; rev. ed., 1868, 1870, p. 410, pl. 18, figs. 1-3.—Foord Cat. Foss. Ceph. British Mus., 1, 1888, p. 224.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 194, fig.

Gomphoceras Marcyae Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 101, pl. 3, fig. 8; p. 109; p. 112.

Niagaran (Racine): Chicago, Illinois.

GOMPHOCERAS SEPTORIS Hall. See *Septameroceras septore*.**Gomphoceras subgracile** Billings.

Gomphoceras subgracile Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 311.

Silurian: Port Daniel, Gaspé, Canada.

Observation.—Possibly a species of *Septameroceras*.

Gomphoceras wabashense Newell.

Gomphoceras wabashensis Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 470-472, figs.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 476, pl. 20, figs. 3, 4.

Niagaran: Delphi and Georgetown, Indiana.

Plesiotype.—Cat. No. 52947, U.S.N.M.

GOMPHOCYSTIS Angelin. See *Gomphocystites* Hall.**GOMPHOCYSTITES** Hall.

Genotype: *G. glans* Hall.

Gomphocystites Hall, 20th Rep. New York State Cab. Nat. Hist. (extras, 1864), 1868, p. 309; rev. ed., 1870, p. 351.—Zittel, Handb. Pal., 1, 1879, p. 415.—Miller, N. A. Geol. Pal., 1889, p. 249.—Jaekel, Stammes. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 419.—Zittel, Grundzüge Pal., 1910, p. 189.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 461.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 156.

Gomphocystis Angelin, Icon. Crinoid, 1878, p. 31.—Haeckel, Amphorideen u. Cystoideen, Leipzig, 1896, p. 115.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 77.

Gomphocystites clavus Hall.

Gomphocystites clavus Hall, 20th Rep. New York State Cab. Nat. Hist. (extras, 1864), 1868, p. 310, pl. 12a (1), fig. 3; rev. ed., 1870, p. 353, pl. 12a, fig. 3.

Niagaran (Racine): Racine, Wisconsin.

Gomphocystites glans Hall.

Gomphocystites glans Hall, 20th Rep. New York State Cab. Nat. Hist. (extras, Dec. 1864), 1868, p. 310, pl. 12(3), fig. 14; pl. 12a(1), figs. 4, 5; rev. ed. 1870, p. 352, pl. 12, fig. 14; pl. 12a, figs. 4, 5.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 11, fig. 2a.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 191, fig.—Jaekel, Stammes. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 421, pl. 2, figs. 8, 9.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 462, fig. 1768.

Niagaran (Racine): Racine, Wisconsin.

Gomphocystites indianensis Miller.

Gomphocystites indianensis Miller, N. A. Geol. Pal., 1889, p. 249, fig. 319.—Jaekel, Stammes. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 421.

Niagaran (Osgood): Jefferson County, Indiana.

Gomphocystites tenax Hall.

Gomphocystites tenax Hall, 20th Rep. New York State Cab. Nat. Hist. (extra 1864), 1868, p. 310, pl. 12(3), fig. 15; pl. 12a(1), figs. 1, 2; rev. ed., 1870, p. 32, pl. 12, fig. 15; pl. 12a, figs. 1, 2.—Roemer, Leth. geog., 1, Leth. Pal., Atlas 1876, pl. 11, fig. 3.—Haeckel, Amphorideen u. Cystoideen, Leipzig, 1888, p. 115, pl. 3, fig. 37.—Jaekel, Stammes. Palmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 421. Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 77, fig. 48.

Niagaran (Lockport): Lockport, New York.

GONAMBONITES PLANA var. **RETROFLEXA** Verneuil. See *Glitambonites planus retroflexus*.

Goniatites canadensis Castelnau.

Not recognized.

Goniatites canadensis Castelnau, Syst. Sil., 1843, p. 34, pl. 11, fig. 7.

Ordovician?: Falls of Montmorency River, near Quebec, Canada.

Observation.—Probably the same as *Sinuities cancellatus*.

GONIOCERAS Hall.

Genotype: *G. anceps* Hall.

Gonioceras Hall, Pal. New York, 1, 1847, p. 54.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 2.—Pictet, Traité de Pal., 2d ed., 2, 1854, p. 638.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 148.—Barrande, Syst. Sil. du Centre Bohème, 2, pt. 3, 1874, p. 678; p. 786.—Hyatt, Science, 3, 1884, p. 124.—Zittel, Handb. Pal., 2, 1884, p. 370.—Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 288.—Miller, N. A. Geol. Pal., 1889, p. 441.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 794.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 322.—Ruedemann, Bull. New York State Mus., 90, 1906, p. 492.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 117.

Gonioceras anceps Hall.

Gonioceras anceps Hall, Pal. New York, 1, 1847, p. 54, pl. 14, figs. 1a-d.—Chapman, Canadian Jour., n. s., 8, 1863, p. 20, fig. 130.—Roemer, Leth. geog., 1, Leth. pal., Atlas, 1876, pl. 6, fig. 5a.—Miller, N. A. Geol. Pal., 1889, p. 441, fig. 742.—Keyes, Missouri Geol. Surv., 5, 1894, p. 220.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 117, fig. 1353.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 794, pl. 47, fig. 5.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 324, fig. 49.

Orthoceras anceps Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 150, fig. 108a, b.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 541, figs.

Ormoceras anceps Chapman, Canadian Jour., n. s., 8, 1863, p. 198, fig. 172; Expos. Min., Geol. Canada, 1864, p. 128, fig. 130; p. 170, fig. 172.

Gonioceras hallii Emmons, Amer. Geology, 1, pt. 2, 1855, p. 152, fig. 31; Mas. Geol., 1860, p. 96, fig. 85.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 258, fig.

Black River: Watertown, etc., New York (Watertown); Ontario; Wisconsin; Minnesota; Kentucky; Tennessee.

Gonioceras chaziense Ruedemann.

Gonioceras chaziense Ruedemann, Bull. New York State Mus., 90, 1906, p. 494, pl. 36, figs. 3, 4.

Chazy (Crown Point): Near Chazy, New York.

GONIOCERAS HALLII Emmons. See *Gonioceras anceps*.

GONIOCERAS LAMBI Whiteaves. See *Tripteroceras lambi*.

Gonioceras occidentale Hall.

Gonioceras occidentalis Hall, Rep. Supt. Geol. Surv. Wisconsin, 1861, p. 47.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 74, pl. 12, figs. 1, 2.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 795, pl. 47, fig. 6.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 117, fig. 1354.—Holtedahl, Videnak. Skrifter, 1, 1912, p. 9, pl. 3, fig. 1.

Black River (Platteville): Wisconsin; Dixon, Illinois; Arctic America.

Plesiotype.—Cat. No. 46527, U.S.N.M.

GONIOGRAPTUS McCoy.

Genotype: *Didymograptus* (*Goniograptus*) *thureau* McCoy.

Goniograptus McCoy, Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 128.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, p. 265.—Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 620, 621.

Goniograptus geometricus Ruedemann.

Goniograptus n. sp. Ruedemann, New York State Pal., Ann. Rep., 1902, p. 566.

Goniograptus geometricus Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 627–630, pl. 7, figs. 5, 10–20, figs. 43–45.

Canadian (Deepkill, *Didymograptus trifidus* zone): Deepkill, Rensselaer County, New York.

Observation.—Compare *Thamnograptus anna*.

Goniograptus perflexilis Ruedemann.

Goniograptus n. sp. Ruedemann New York State Pal., Ann. Rep., 1902, p. 556.

Goniograptus perflexilis Ruedemann, Mem. New York State Mus., 7, pt. 1, 1904, pp. 625–627, pl. 6, figs. 16–18; pl. 7, figs. 1–4, 6–9, figs. 39–42.

Canadian: Deepkill and Mount Moreno, New York (Deepkill, *Tetragraptus* and *Didymograptus* zones); Point Levis, Quebec (Levis, *Didymograptus* and *Diplograptus dentatus* zones).

Goniograptus thureau (McCoy).

Didymograptus (*Goniograptus*) *thureau* McCoy, Ann. Mag. Nat. Hist., 4th ser., 18, 1876, pp. 128–130.

Graptolites (*Didymograptus*) *thureau* McCoy, Geol. Surv. Victoria, Prodr. Pal., Victoria, dec. 5, 1877, p. 39.

Goniograptus thureau Ami, Geol. Surv. Canada, Rep., 2d ser., 3, pt. 2, 1889, p. 116k.—Ruedemann, Bull. New York State Mus., Pal. Ann. Rep., 1902, pp. 556, 565, 576–92, figs. 1–11; *ibid.*, Mem. 7, pt. 1, 1904, pp. 621–624, pl. 6, figs. 1–15, figs. 37, 38.

Dichograptus (*Clonograptus*, *Goniograptus*) *thureau* Frech, Leth. Pal., 1, Lief. 3, 1897, p. 600, fig. 165.

Dichograptus (*Goniograptus*) *thureau* Grabau and Shimer, N. A. Index Fossils 1, 1906, p. 29, fig. 41d, 42.

Goniograptus thureau var. *selwyni* Ami, Can. Rec. Sci., 3, 1889, p. 422–423, p. 502, 503, figs. 1, 2.

Goniograptus thureau var. *postremus* Ruedemann, Bull. New York State Mus., 52, 1902, p. 587, fig. 14.

Lower Ordovician: Sandhurst, Victoria; Point Levis, Quebec (Levis, *Clonograptus* zone); Deepkill, Rensselaer County, New York (Deepkill, *Tetragraptus* and *D. bifidus* zones).

GONIOGRAPTUS THUREAU var. **POSTREMUS** Ruedemann. See *Goniograptus thureau*.

GONIOGRAPTUS THUREAU var. **SELWYNI** Ami. See *Goniograptus thureau*.

GONIOPHORA Phillips.Genotype: *G. cymbiformis* Sowerby

Goniophora Hall, Pal. New York, 5, pt. 1, Lam., 2, 1885, p. 13.—Nettehok Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 213.—Miller, N. A. Geol. Pal., 1889, p. 481.—Whidborne, Mon. Dev. Fauna South England: Pal. Soc., 1892, p. 16.—Koken, Die Leitfossilien, Leipzig, 1896, p. 325.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 251.—Hind, Mon. Brit. Carb. Lamell., 1, Pal. Soc., 1899, p. 339.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 518.

***Goniophora bellula* Billings.**

Goniophora bellula Billings, Pal. Foss. Geol. Surv. Canada, 2, pt. 1, 1874, p. 13, pl. 8, fig. 9.

Silurian: Arisaig, Nova Scotia.

***Goniophora carinata* (Hall).**

Modiolopsis carinatus Hall, Pal. New York, 1, 1847, p. 160, pl. 35, figs. 11a-c.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 173, fig. 159.—Leake, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 407, fig.

Goniophora carinata Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 504 (gen. red.)—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 173, pl. 11, fig. 23.

Cypriocardia americana D'Orbigny, Prodr. Pal., 1, 1850, p. 121.—Emmons, Ann. Geol., 1, pt. 2, 1855, p. 174, pl. 14, fig. 11.

Trenton: Middleville, etc., New York; New Jersey; etc.

***Goniophora consimilis* Billings.**

Goniophora consimilis Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 135, pl. 8, fig. 8.

Silurian: Arisaig, Nova Scotia.

***Goniophora crassa* Whiteaves.**

Goniophora crassa Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 1, pl. 2, figs. 3, 3a-c; *ibid.*, pt. 2, 1895, p. 67 (loc. occ.).

Niagaran (Guelph): Durham, Ontario.

***Goniophora dubia* (Hall).**

Modiolopsis? dubius Hall, Pal. New York, 3, 1859, p. 264, pl. 49, figs. 2a-a.

Goniophora dubia Whitfield, Ann. New York Acad. Sci., 5, 1891, p. 514, pl. 1, figs. 24-26; Geol. Surv. Ohio, Pal., 7, 1893, p. 415, pl. 1, figs. 24-26.—Sherzer,

Michigan Geol. Surv., 7, pt. 1, 1900, p. 224, pl. 17, figs. 24-26.—Grabau and

Shimer, N. A. Index Fossils, 1, 1909, p. 519, fig. 697.—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 168, pl. 30, figs. 24-26.

Cayugan (Manlius): Winfield, Herkimer County, New York.

Lower Monroan: Monroe County, Michigan; Put-in-Bay, Lake Erie.

***Goniophora mediocris* Billings.**

Goniophora mediocris Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 137, pl. 9, fig. 1.

Silurian: Arisaig, Nova Scotia.

***Goniophora speciosa* Hall.**

Goniophora speciosa Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 317, pl. 27, figs. 26, 27; Trans. Albany Inst., 10, 1883, p. 73.

Niagaran (Waldron): Waldron, Indiana.

***Goniophora transiens* Billings.**

Goniophora transiens Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 134, pl. 8, fig. 7.

Silurian (Stonehouse): Arisaig, Nova Scotia.

GONIOPHYLLUM Edwards and Haime.Genotype: *Turbinolia pyramidalis* Hisinger.

Goniophyllum Edwards and Haime, *Mon. d. Polyp. Foss. d. Terr. Pal.*, 1851 (*Arch. Mus. Hist. Nat.*, 5), pp. 169, 404.—Pictet, *Traite de Pal.*, 2d ed., 4, 1857, p. 456.—Milne-Edwards, *Hist. Nat. d. Corall.*, 3, 1860, p. 397.—Lindstrom, *Geol. Mag.*, 3, 1866, pp. 357, 411.—Salter, *Cat. Camb. Sil. Foss.*, 1873, p. 114.—Dybowski, *Archiv. f. Natur. Liv.-Ehst-und Kurl.*, 5, 1873, p. 340.—Zittel, *Handb. Pal.*, 1, 1879, p. 235.—Lindstrom, *Bihang till K. Sv. Vet.-Akad. Handl.*, 7, 1882, p. 42.—Roemer, *Leth. Geog.*, pt. 1, *Leth. Pal.*, 1883, p. 406.—Sherzer, *Amer. Geol.*, 7, 1891, pp. 296-301.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 313.—Weller, *Jour. Geol.*, 6, 1898, p. 700; *Bull. Chicago Acad. Sci., Nat. Hist. Surv.*, 4, pt. 1, 1900, p. 20; Zittel-Eastman *Textb. Pal.*, 1, 1900, p. 79; *ibid.*, 2d ed., 1913, p. 87.

Goniophyllum pyramidale (Hisinger).

Turbinolia turbinata var. *pyramidalis* Hisinger, *Tableau des petrif. de Suede*, 1st ed., 1829, p. 22.

Turbinolia pyramidalis Hisinger, *Tableau des petrif. de Suede*, 2d ed., 1831, p. 26; *Lethæa*, 1833, p. 101, pl. 28, fig. 12.

Goniophyllum pyramidale Milne-Edwards and Haime, *Polypiers fossiles*, 1851, p. 404, pl. 2, figs. 4, 4a.—Lindstrom, *Öfvers. Vet.-Akad. Forhandl.*, 1865, p. 271, pl. 30, figs. 1-9; *Bihang till K. Sv. Vet.-Akad., Handl.*, 7, 1882, p. 43, pls. 1, 5, 6, 7, 8, 9 (see for complete bibliography).—Winchell, *Amer. Geol.*, 6, 1890, p. 326.—Weller and Davidson, *Jour. Geol.*, 4, 1896, p. 170, pl. 6, figs. 6-8.—Weller, *Bull. Chicago Acad. Sci., Nat. Hist. Surv.*, 4, pt. 1, 1900, p. 19, fig. 5.

Cyathophyllum tetragonum Quenstedt, *Handb. der Petrefaktenkunde*, Ab. 1, 6, 1879, p. 407, pl. 156, figs. 82-85.

Silurian: Island of Gotland; England; La Motte, Dubuque County, Iowa (Niagaran).

GONIOSTROPHA (part) Ehlert. See *Hormotoma* Salter.**GONIOTRYPA** Ulrich.Genotype: *G. bilateralis* Ulrich.

Goniotrypa Ulrich, *Contr. Micro-Pal. Cambro-Sil.*, pt. 2, 1889, p. 40.—Miller, *N. A. Geol. Pal.*, 1889, p. 307.—Ulrich, *Geol. Surv. Illinois*, 8, 1890, p. 389.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 545.—Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 49.

Goniotrypa bilateralis Ulrich.

Goniotrypa bilateralis Ulrich, *Contr. Micro-Pal. Cambro-Sil.*, pt. 2, 1889, p. 41, figs. 1-3, pl. 9, fig. 1.—Miller, *N. A. Geol. Pal.*, 1889, fig. 481 (p. 307).—Whiteaves, *Pal. Foss.*, 3, 1895, p. 118.

Richmond: Stony Mountain, Manitoba (Stony Mountain); Island of Anticosti (Charleton).

Cotypes.—Cat. No. 43475, U.S.N.M.

GONIURUS Raymond.Genotype: *Bathyrurus perspicator* Billings.

Goniurus Raymond, *Bull. Victoria Memorial Mus.*, 1, 1913, p. 65.

Goniurus caudatus (Billings).

Bathyrurus caudatus Billings, *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 261, fig. 245.

Goniurus caudatus Raymond, *Bull. Victoria Memorial Mus.*, 1, 1913, p. 66.

Canadian: Port aux Choix, Newfoundland (Quebec—G., H.); Fort Cassin, Vermont; and Ticonderoga, New York (Beekmantown).

Goniurus elongatus Raymond.

Goniurus elongatus Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 66, pl. 7, figs. 11, 12.

Canadian: (Beekmantown): Philipsburg and St. Armond, Missisquoi County, Quebec.

Goniurus perspicator (Billings).

Bathyrurus perspicator Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 3, fig. 191.

Goniurus perspicator Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 66, pl. 7, fig. 10.

Canadian (Beekmantown): St. Antoine, above Quebec, Canada.

GORGONIA Hall. See *Chasmatopora* Eichwald.**Gorgonia anticorum** Castelnau.

Not recognized

Gorgonia anticorum Castelnau, Syst. Sil., 1843, p. 50, pl. 24, fig. 1.

Silurian: Lake Huron.

GORGONIA ASPERA Hall. See *Chasmatopora aspera*.**GORGONIA FLABELLIFORMIS** Eichwald. See *Dictyonema flabelliforme*.**Gorgonia infundibuliformis** Eaton.

Not recognized

Gorgonia infundibuliformis Eaton, Geol. Textbook, ed. 2, 1832, p. 43, pl. 4, fig. 4.

GORGONIA PERANTIQUEA Hall. See *Protocrisina perantiqua*.**GORGONIA PROAVUS** Eichwald. See *Graptodictya proava*.**GORGONIA? RETEFORMIS** Hall. See *Dictyonema retiforme*.**Gorgonia siluriana** Castelnau.

Not recognized

Gorgonia siluriana Castelnau, Syst. Sil., 1843, p. 50.

Silurian: Lake Huron.

GOTLANDIA Dall. See *Trimerella* Billings.**GRAMMYSIA** Verneuil.Genotype: *G. hamiltonensis* Verneuil.

Grammysia Verneuil, Bull. Geol. Soc. France (2) 4, 1847, p. 696.—Pictet, *Traité de Pal.*, 2d ed., 3, 1855, p. 530.—Barrande, Syst. Sil. du Centre Bohème, 6, 1881, p. 85; Acephales: Ext. Syst. Sil. du Centre Bohème, 1881, p. 135.—Zittel, Handb. Pal., 2, 1881, p. 128.—Hall, Pal. New York, 5, pt. 1, Lam. 2, 1885, p. 30.—Miller, N. A. Geol. Pal., 1889, p. 482.—Nettelroth, Kentucky Foss. Shell. Geol. Surv. Kentucky, 1889, p. 207.—Koken, Die Leitfossilien, Leipzig, 1896, p. 525.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 260.—Dall, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 439.

Grammysia acadica Billings.

Grammysia Acadica Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 14, pl. 9, fig. 4, 4a.

Silurian (Moydart, Stonehouse): Arisaig, Nova Scotia.

Grammysia? arctica Bassler (new name).

Grammysia? triangulata Høltedahl (not Williams, 1913), 2d Arct. Exp. Foss. 1898-1902, No. 32, 1914, p. 28, pl. 8, fig. 8.

Helderbergian (Lower beds): Southwestern Ellesmereland, Arctic America.

GRAMMYSIA CASWELLI Foerste. See *Cuneamya? caswelli*.**GRAMMYSIA CINGULATA TRIANGULATA** McCoy. See *Grammysia triangulata*.

GRAMMYSIA NEGLECTA Hall and Whitfield. See *Cuneamysa neglecta*.

Grammysia pembrokeensis Williams.

Grammysia pembrokeensis Williams, Proc. U. S. Nat. Mus., 45, 1913, p. 344, pl. 31, fig. 2.

Silurian (Pembroke): Pembroke, Washington County, Maine.

Holotype.—Cat. No. 58968, U.S.N.M.

Grammysia remota Billings.

Grammysia remota Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 50, 1874, p. 139, pl. 9, fig. 2.

Silurian: Arisaig, Nova Scotia.

Grammysia rustica Billings.

Grammysia rustica Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 139, pl. 9, fig. 3.

Silurian (Stonehouse): Arisaig, Nova Scotia.

Grammysia triangulata (Salter).

Orthonota triangulata Salter, Mem. Geol. Surv. Great Britain, 1848, 2, pt. 1, Pal. app., p. 361, pl. 18, fig. 7.

Grammysia cingulata var. *triangulata* McCoy, British Pal. Foss., 1855, p. 280, pl. 1k, fig. 28.

Grammysia triangulata Williams, Proc. U. S. Nat. Mus., 45, 1913, p. 345, pl. 31, fig. 17.

Silurian: Great Britain; Long Cove, Washington County, Maine (Pembroke).

Plesiotype.—Cat. No. 58970, U.S.N.M.

GRAMMYSIA? TRIANGULATA Høltedahl. See *Grammysia arctica*.

GRAPTODICTYA Ulrich.

Genotype: *Ptilodictya perelegans* Ulrich.

Graptodictya Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, pp. 151, 165.—Miller, N. A. Geol. Pal., 1889, p. 307.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 393.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 14.—Simpson, 14th Ann. Rep. New York State Geol. for 1894, 1897, p. 541.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 46.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 747.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 121.

GRAPTODICTYA NITIDA Ulrich. See *Graptodictya perelegans*.

Graptodictya perelegans (Ulrich).

Ptilodictya perelegans Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 94, pl. 4, figs. 16, 16a.

Graptodictya perelegans Ulrich, *ibid.*, 5, 1882, p. 165, pl. 8, fig. 5.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 122, fig., p. 121.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 280.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 836, pl. 29, fig. 8.

Graptodictya nitida Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, p. 166, pl. 7, figs. 8, 8a.

Richmond (Waynesville, Liberty): Clarkesville, etc., Ohio; Indiana.

Holotypes.—Cat. Nos. 43274, 43661, U.S.N.M.

Graptodictya proava (Eichwald).

Gorgonia proavus Eichwald, Urwelt Russlands, 2, 1840, p. 44, pl. 1, fig. 5.

Coscinium proavus Eichwald, Leth. Rossica, 1, 1860, p. 398.

Coscinium proavium Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 158, fig. 122.

Graptodictya proava—Continued.

Graptodictya proava Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 123-126, figs. 49, 50; pl. 8, fig. 2; pl. 9, figs. 1-6.

Clathropora flabellata Hall, Foster and Whitney's Rep. Geol. Lake Superior Land Dist., pt. 2, 1851, p. 207, pl. 24, figs. 2a, b.

Stictoporella flabellata Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 416.

Stictoporella cribrosa Sardeson (not Ulrich), Jour. Geol., 9, 1901, p. 157, pl. B, figs. 7-9.

Middle Ordovician: Uxnorm, Esthonia, Russia (Wassalem); Kenyon, Minnesota, and Escanaba River, Michigan (Trenton).

Plesiotype.—Cat. No. 57216, U.S.N.M.

GRAPTOLITES (DIDYMOGRAPTUS) BRYONOIDES McCoy. See *Tetragraptus serra*.

GRAPTOLITES (DIDYMOGRAPTUS) CADUCEUS McCoy. See *Didymograptus (Isograptus) caduceus*.

GRAPTOLITES DENTATUS Vanuxem. See *Glossograptus (Orthograptus) quadrim-cronatus*.

GRAPTOLITES (DIDYMOGRAPTUS) EXTENSUS McCoy. See *Didymograptus extensus*.

GRAPTOLITES (DIDYMOGRAPTUS) FRUTICOSUS McCoy. See *Tetragraptus fruticosus*.

GRAPTOLITES (DIDYMOGRAPTUS) LOGANI McCoy. See *Loganograptus logani*.

GRAPTOLITES NILSSONI Harkness. See *Monograptus gregarius*.

GRAPTOLITES (DIDYMOGRAPTUS) OCTOBRACHIATUS McCoy. See *Dichograptus octo-brachiatus*.

GRAPTOLITES PRIODON of authors. See *Monograptus priodon*.

GRAPTOLITES PRISTIS (part) of authors. See *Diplograptus foliaceus*.

GRAPTOLITES (DIDYMOGRAPTUS) QUADRIBRACHIATUS McCoy. See *Tetragraptus quadribrachiatu*s.

GRAPTOLITES (DIDYMOGRAPTUS) THUREAUI McCoy. See *Goniograptus thureau*i.

GRAPTOLITES VENOSUS Hall. See *Retiolites geinitzianus venosus*.

GRAPTOLITHUS ABNORMIS Hall. See *Clonograptus abnormis*.

GRAPTOLITHUS ACUTUS Hopkinson. See *Monograptus intermedius*.

GRAPTOLITHUS ALATUS Hall. See *Tetragraptus alatus*.

GRAPTOLITHUS AMPLEXICAULE Hall. See *Diplograptus (Glyptograptus) amplexi-caule*.

GRAPTOLITHUS ANGUSTIFOLIUS Hall. See *Diplograptus (Glyptograptus) angustifolia*.

GRAPTOLITHUS ANNECTANS Walcott. See *Leptograptus annectans*.

GRAPTOLITHUS ARCUATUS Hall. See *Didymograptus arcuatus*.

GRAPTOLITHUS ARUNDINACEUS Hall. See *Mastigograptus arundinaceus*.

GRAPTOLITHUS BICORNIS Hall. See *Climacograptus bicornis*.

GRAPTOLITHUS BIFIDUS Hall. See *Didymograptus bifidus*.

- GRAPTOLITHUS BIGSBYI Hall. See *Tetragraptus similis*.
- GRAPTOLITHUS BRYONOIDES Hall. See *Tetragraptus amii* and *T. serra*.
- GRAPTOLITHUS CADUCEUS Chapman. See *Didymograptus (Isograptus) caduceus*.
- GRAPTOLITHUS CLINTONENSIS Hall. See *Monograptus clintonensis*.
- GRAPTOLITHUS CONSTRICTUS Hall (part). See *Didymograptus extensus* and *D. hirundo*.
- GRAPTOLITHUS CONVOLUTUS Carruthers. See *Monograptus convolutus*.
- GRAPTOLITHUS CRUCIFER Hall. See *Tetragraptus crucifer*.
- GRAPTOLITHUS DENTATUS D'Orbigny. See *Diplograptus foliaceus*.
- GRAPTOLITHUS DENTICULATUS Hall. See *Tetragraptus denticulatus*.
- GRAPTOLITHUS DIVARICATUS Hall. See *Dicellograptus divaricatus*.
- GRAPTOLITHUS DIVERGENS Hall. See *Amphigraptus divergens*.
- GRAPTOLITHUS ENSIFORMIS Hall. See *Trigonograptus ensiformis*.
- GRAPTOLITHUS EXTENSUS Hall. See *Didymograptus extensus*.
- GRAPTOLITHUS EXTENUATUS Hall. See *Didymograptus extenuatus*.
- GRAPTOLITHUS FLACCIDUS Hall. See *Leptograptus flaccidus*.
- GRAPTOLITHUS FLEMINGII Salter. See *Monograptus flemingii*.
- GRAPTOLITHUS (DICHOGRAPTUS) FLEXILIS Hall. See *Clonograptus flexilis*.
- GRAPTOLITHUS FOLIACEUS Murchison. See *Diplograptus foliaceus*.
- GRAPTOLITHUS FOLIUM Salter. See *Diplograptus foliaceus*.
- GRAPTOLITHUS FRUTICOSUS Hall. See *Tetragraptus fruticosus*.
- GRAPTOLITHUS FURCATUS Hall. See *Dicranograptus furcatus*.
- GRAPTOLITHUS GRACILIS Hall. See *Nemagraptus gracilis* and *N. gracilis surcularis*.
- GRAPTOLITHUS HEADI Hall. See *Tetragraptus headi*.
- GRAPTOLITHUS (DIPLOGRAPTUS) HYPNIFORMIS White. See *Diplograptus foliaceus*.
- GRAPTOLITHUS INDENTUS Hall. See *Didymograptus indentus*.
- GRAPTOLITHUS INTERMEDIUS Carruthers. See *Monograptus intermedius*.
- GRAPTOLITHUS LAEVIS Hall. See *Phycograptus laevis*.
- GRAPTOLITHUS LOGANI Hall. See *Loganograptus logani*.
- GRAPTOLITHUS MARCIDUS Hall. See *Cryptograptus tricornis*.
- GRAPTOLITHUS MILESI Hall. See *Clonograptus milesi*.
- GRAPTOLITHUS MUCRONATUS Hall. See *Lasiograptus mucronatus*.
- GRAPTOLITHUS MULTIFASCIATUS Hall. See *Amphigraptus multifasciatus*.
- GRAPTOLITHUS MULTIFASCICULATUS Lealey. See *Amphigraptus multifasciatus*.
- GRAPTOLITHUS NITIDUS Hall. See *Didymograptus nitidus*.
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GRAPTOLITHUS OCTOBRACHIATUS Hall. See *Dichograptus octobrachiatus*.

GRAPTOLITHUS OCTONARIUS Hall. See *Dichograptus octonarius*.

GRAPTOLITHUS PATULUS Hall. See *Didymograptus patulus*.

GRAPTOLITHUS PENNATULUS Hall. See *Didymograptus pennatulus*.

GRAPTOLITHUS (DIPLOGRAPTUS) PEOSTA Hall. See *Diplograptus peosta*.

GRAPTOLITHUS PRIODON Barrande. See *Monograptus priodon*.

GRAPTOLITHUS PRIODON Chapman. See *Monograptus clintonensis*.

GRAPTOLITHUS PRISTINIFORMIS Hall. See *Diplograptus dentatus*.

GRAPTOLITHUS PRISTIS Hall (part). See *Diplograptus foliaceus*, *D. foliaceus acutus*, *D. foliaceus incisus*, *Glossograptus* (*Orthograptus*) *quadrimucronatus*, and *Diplograptus peosta*.

GRAPTOLITHUS PUTILLUS Hall. See *Climacograptus* (*Mesograptus*) *putillus*.

GRAPTOLITHUS QUADRIBRACHIATUS Hall. See *Tetragraptus quadribachiatus*.

GRAPTOLITHUS QUADRIMUCRONATUS Hall. See *Glossograptus* (*Orthograptus*) *quadrimucronatus*.

GRAPTOLITHUS RAMOSUS Salter. See *Dicranograptus rectus*.

GRAPTOLITHUS (DIPLOGRAPTUS) RAMOSUS Chapman. See *Dicranograptus ramosus*.

GRAPTOLITHUS RAMULUS Hall. See *Temnograptus?* *ramulus*.

GRAPTOLITHUS (CLIMACOGRAPTUS) RAMULUS White. See *Dicranograptus nicholsoni whitianus*.

GRAPTOLITHUS RICHARDSONI Hall. See *Holograptus?* *richardsoni*.

GRAPTOLITHUS RIGIDUS Hall. See *Clonograptus rigidus*.

GRAPTOLITHUS SAGITTARIUS Hisinger. See *Didymograptus sagitticaulia*.

GRAPTOLITHUS (PRIONODUS) SEDGWICKII DISTANS. See *Monograptus distans*.

GRAPTOLITHUS (MONOPRION) SERRATULUS Hall. See *Didymograptus serratulus*.

GRAPTOLITHUS SEXTANS Hall. See *Dicellograptus sextans* and *D. sextans enlia*.

GRAPTOLITHUS SIMILIS Hall. See *Didymograptus similis*.

GRAPTOLITHUS SPINULOSUS Lapworth. See *Glossograptus ciliatus*.

GRAPTOLITHUS SUBTENUIS Hall. See *Didymograptus subtenuis*.

GRAPTOLITHUS TENTACULATUS Hall. See *Retiograptus tentaculatus*.

GRAPTOLITHUS TENUIS Portlock (part). See *Leptograptus annectans* and *Didymograptus subtenuis*.

GRAPTOLITHUS WHITFIELDI Hall. See *Glossograptus whitfieldi* and *Leptograptus bimucronatus*.

GRAPTOLITHUS WHITIANUS Miller. See *Dicranograptus nicholsoni whitianus*.

GRAPTOPORA SOCIALIS Salter. See *Dictyonema fiabelliforme*.

GRAPTOSPONGIA Ruedemann.Genotype: *G. pusilla* Ruedemann.*Graptospongia* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 485.**Graptospongia** *pusilla* Ruedemann.*Graptospongia pusilla* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 485, figs. 467, 468.

Chazyan (Normanskill): Schuylerville, Saratoga County, New York.

GREENFIELDIA Grabau. See *Hindella* subgenus *Greenfieldia*.**GYPIDIA** UNGUIFORMIS Ulrich. See *Conchidium unguiforme*.**GYPIDULA** Dalman. See *Conchidium* Linnaeus.**GYPIDULA** Hall.Genotype: *Pentamerus occidentalis* Hall.*Gypidula* Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 163; Pal. New York, 4, 1867, pp. 373, 380.—Zittel, Handb. Pal., 1, 1880, p. 694.—Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 161.—Miller, N. A. Geol. Pal., 1889, p. 346.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 322.*Sieberella* Ehlert, Fischer's Man. Conch., 1887, p. 1311.*Gypidula* and *Sieberella* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 245; 13th Ann. Rep. New York State Geol., 1895, pp. 845, 846.**Gypidula** (*Sieberella*) *coeymanensis corriganensis* Maynard.*Gypidula* (*Sieberella*) *coeymanensis* var. *corriganensis* Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 345, pl. 62, figs. 12-18.

Helderbergian (Keyser): Devils Backbone, near Cumberland, Maryland; Keyser, West Virginia.

Gypidula (*Sieberella*) *coeymanensis prognostica* Maynard.*Gypidula* (*Sieberella*) *coeymanensis* var. *prognostica* Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 344, pl. 62, figs. 9-11.—Holtedahl, Second Arct. Exped. "Fram," 1898-1902, No. 32, 1914, p. 21, pl. 7, fig. 5.

Helderbergian (Keyser): Pinto, Cumberland, Hancock, etc., Maryland; Keyser, West Virginia; Hyndman, Pennsylvania; Southwestern Ellesmereland, Arctic America.

Gypidula coppingeri (Etheridge).*Pentamerus coppingeri* Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 594, pl. 25, figs. 2, 3.*Gypidula coppingeri* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 226.

Niagaran: Offley Island, Arctic America.

Gypidula (*Sieberella*) *galeata* (Dalman).*Atrypa galeata* Dalman, Kongl. Svenaka, Vet.-Akad. Handl., för 1827, 1828, p. 46, pl. 5, fig. 4.—Troost, 6th Geol. Rep. Tennessee, 1841, p. 15.—Vanuxem, Geol. New York, Rep. 3d Dist., 1842, p. 117, fig. 1.—Castelnau, Essai Syst. Sil. l'Amérique Septentrionale, 1843, p. 39, pl. 14, fig. 4.*Pentamerus galeatus* Hall, 10th Rep. New York State Cab. Nat. Hist., 1857, p. 105, figs. 1-3.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 825, fig. 646.—Hall, Pal. New York, 3, 1859, p. 257, pl. 46, fig. 1; pl. 47, fig. 1.—Billings, Geol. Canada, 1863, p. 957, fig. 454.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 616, fig.—Sherzer, Michigan Geol. Surv., 7, 1900, pt. 1, p. 224.*Pentamerus galeatus* var. *Whiteaves*, Cont. to Canadian Pal., 1, 1891, p. 234.*Sieberella galeatus* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 246, fig. 175; pl. 72, figs. 7-13.

Gypidula (Sieberella) galeata—Continued.

Gypidula (Sieberella) galeatus Kindle and Breger, 28th Ann. Rep. Dep., Geol. Nat. Res. Indiana, 1904, p. 437, pl. 2, figs. 20, 21, 23–29.—Grabau and Shinar, N. A. Index Fossils, 1, 1907, p. 278, fig. 388.

Devonian: Europe; New York; Maryland; Pennsylvania; New Brunswick; etc. Identified in Niagara at Delphi, Indiana, and in the Monroan of Michigan, both probably erroneously.

Gypidula globulosa (Nettelroth).

Pentamerus globulosus Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 54.

Gypidula globulosa Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 226.

Niagaran (Louisville): Louisville, Kentucky.

Cotypes.—Cat. No. 51339, U.S.N.M.

Gypidula knotti (Nettelroth).

Pentamerus knotti Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 56, pl. 32, figs. 9–12.

Gypidula knotti Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 226.

Niagaran (Louisville): Louisville, Kentucky.

Holotype.—Cat. No. 51354, U.S.N.M.

Gypidula (Sieberella) nucleus (Hall and Whitfield).

Pentamerus galeatus Hall and Whitfield, 24th Rep. New York State Cab. Nat. Hist., 1872, pp. 197, 200a.

Pentamerus nucleus Hall and Whitfield, 27th Rep. New York State Cab. Nat. Hist., 1875, pl. 9, figs. 30–32.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 59, pl. 27, figs. 25–27; pl. 33, figs. 27–33.

Sieberella nucleus Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 247, pl. 72, figs. 1–3.

Gypidula nucleus Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 226.

Gypidula (Sieberella) nucleus, Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 438, pl. 2, figs. 18, 19.

Niagaran: Louisville, Kentucky (Louisville); Georgetown, Indiana.

Plenotypes.—Cat. No. 51328, U.S.N.M.

Gypidula (Sieberella) roemeri (Hall and Clarke).

Pentamerus galeatus Roemer (not Dalman), Sil. Fauna West. Tennessee, 1860, p. 73, pl. 5, fig. 14.

Sieberella roemeri Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 247, pl. 72, fig. 6; 48th Rep. New York State Mus., 2, 1897, p. 370, pl. 13, fig. 4; 14th Rep. State Geol. New York for 1894, 1897, p. 370, pl. 13, fig. 4.

Gypidula roemeri Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 227.—Foerste, Jour. Geol., 11, 1903, p. 711 (loc. occ.); Bull. Sci. Lab. Denison Univ., 14, 1909, p. 70, pl. 3, fig. 51C.

Niagaran: Decatur County, Tennessee (Brownsport); ?Newsom, Tennessee (Waldron).

Gypidula simplex Foerste.

Gypidula simplex Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 70, pl. 3, figs. 51A, B.

Niagaran (Waldron): Newsom, Tennessee.

Gypidula subglobosa Maynard.

Gypidula subglobosa Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 346, pl. 62, figs. 20–22.

Helderbergian (Keyser): Cash Valley, near Cumberland, Maryland.

Gypidula (Sieberella) uniplicata (Nettelroth).

Pentamerus uniplicatus Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 63, pl. 33, figs. 25, 26.

Sieberella uniplicata Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 247.

Gypidula uniplicata Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 226.

Niagaran (Louisville): Louisville, Kentucky.

Holotype.—Cat. No. 51337, U.S.N.M.

GYROCERAS Dekoninck.

Genotype: *G. paradoxicum* Dekoninck.

Gyroceras Dekoninck, Desc. Animaux Fossiles, Liege, 1842, p. 530.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 27.—Woodward, Man. Mollusca, pt. 1, 1851, p. 91, fig. 52.—Saemann, Palaeontographica, 3, 1852, pp. 139, 159.—Barrande, Neues Jahrb. f. Min., 1854, etc., p. 7, pl. 1, figs. 4a, b.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 651.—Barrande, Neues Jahrb. f. Min., etc., 1855, p. 259; Bull. Soc. Geol. France, 2d ser., 12, 1855, p. 159, pl. 5, fig. 7.—Billings, Canadian Nat. Geol., 2, 1857, p. 136, pl. 2, fig. 5.—Chapman, Canadian Jour., n. s., 2, 1857, p. 266.—Salter, Geol. Surv. Canada, dec. 1, 1859, pp. 31, 32.—Barrande, Syst. Sil. du Centre Boheme, 2, pt. 1, 1867, p. 156.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th Ser., 1, 1879, p. 64.—Hall, Pal. New York, 5, pt. 2, 1879, pp. 358, 368, 389.—Koninck, Ann. d. Mus. Royal d'Hist. Nat. de Belgique, 5, 1880, p. 1.—Blake, Mon. British Foss. Ceph., 1882, p. 65.—Zittel, Handb. Pal., 2, 1884, p. 376.—Miller, N. A. Geol. Pal., 1889, p. 41.—Whidborne, Mon. Dev. Fauna South England, 1, Pal. Soc., 1890, p. 90.—Foord, Cat. Foss. Ceph. British Mus., 2, 1891, p. 53.—Koken, Die Leitfossilien, Leipzig, 1896, p. 50, fig. 34.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 1027.

Gyroceras abruptum Hall.

Gyroceras abruptum Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 325; Trans. Albany Inst., 10, 1883, p. 75

Niagaran (Waldron): Waldron, Indiana.

Gyroceras americanum Billings.

Gyroceras (Lituites) *americanum* Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 309.

Trochoceras americanum? Foord, Cat. Foss. Ceph. British Mus., 2, 1891, p. 40.

Silurian: Port Daniel, Gaspe, Canada.

Gyroceras baeri (Meek and Worthen).

Trochoceras? *Baeri* Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 263.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 157, pl. 13, fig. 9.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 133.

Lituites baeri James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 248.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1228, figs.

Gyroceras baeri Miller, N. A. Geol. Pal., 1889, p. 441 (gen. ref.).—Cumings, 32d Ann. Rep. Dep. Geol. and Nat. Res. Indiana, 1908, p. 1032, pl. 51, fig. 1.

Richmond (Liberty): Richmond, etc., Indiana; Warren and Clinton Counties, Ohio.

Gyroceras bannisteri Winchell and Marcy.

Gyroceras bannisteri Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 102.

Trochoceras (*Gyroceras*) *bannisteri* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, pp. 261, 393; rev. ed., 1870, p. 403, pl. 25, fig. 17.

Niagaran (Racine): Chicago, Illinois; Wisconsin.

GONIOPHORA Phillips.Genotype: *G. cymbiformis* Sowerby.

Goniophora Hall, Pal. New York, 5, pt. 1, Lam., 2, 1885, p. 13.—Nettelbladt Kentucky Foss. Shells, Geol. Surv. Kentucky, 1889, p. 213.—Miller, N. A. Geol. Pal., 1889, p. 481.—Whidborne, Mon. Dev. Fauna South England, 2 Pal. Soc., 1892, p. 16.—Koken, Die Leitfossilien, Leipzig, 1896, p. 525.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 251.—Hind, Mon. British Carb. Lamell., 1, Pal. Soc., 1899, p. 339.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 518.

***Goniophora bellula* Billings.**

Goniophora bellula Billings, Pal. Foss. Geol. Surv. Canada, 2, pt. 1, 1874, p. 136, pl. 8, fig. 9.

Silurian: Arisaig, Nova Scotia.

***Goniophora carinata* (Hall).**

Modiolopsis carinatus Hall, Pal. New York, 1, 1847, p. 160, pl. 35, figs. 11a-c.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 173, fig. 159.—Leakey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 407, fig.

Goniophora carinata Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 504 (gen. rel.).—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 173, pl. 11, fig. 23.

Cypricardia americana D'Orbigny, Prodr. Pal., 1, 1850, p. 121.—Emmons, Amer. Geol., 1, pt. 2, 1855, p. 174, pl. 14, fig. 11.

Trenton: Middleville, etc., New York; New Jersey; etc.

***Goniophora consimilis* Billings.**

Goniophora consimilis Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 135, pl. 8, fig. 8.

Silurian: Arisaig, Nova Scotia.

***Goniophora crassa* Whiteaves.**

Goniophora crassa Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 9, pl. 2, figs. 3, 3a-c; *ibid.*, pt. 2, 1895, p. 67 (loc. occ.).

Niagaran (Guelph): Durham, Ontario.

***Goniophora dubia* (Hall).**

Modiolopsis? dubius Hall, Pal. New York, 3, 1859, p. 264, pl. 49, figs. 2a-e.

Goniophora dubia Whitfield, Ann. New York Acad. Sci., 5, 1891, p. 514, pl. 5, figs. 24-26; Geol. Surv. Ohio, Pal., 7, 1893, p. 415, pl. 1, figs. 24-26.—Sherzer, Michigan Geol. Surv., 7, pt. 1, 1900, p. 224, pl. 17, figs. 24-26.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 519, fig. 697.—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 168, pl. 30, figs. 24-26.

Cayuga (Manlius): Winfield, Herkimer County, New York.

Lower Monroan: Monroe County, Michigan; Put-in-Bay, Lake Erie.

***Goniophora mediocris* Billings.**

Goniophora mediocris Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 137, pl. 9, fig. 1.

Silurian: Arisaig, Nova Scotia.

***Goniophora speciosa* Hall.**

Goniophora speciosa Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 317, pl. 27, figs. 26, 27; Trans. Albany Inst., 10, 1883, p. 73.

Niagaran (Waldron): Waldron, Indiana.

***Goniophora transiens* Billings.**

Goniophora transiens Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 134, pl. 8, fig. 7.

Silurian (Stonehouse): Arisaig, Nova Scotia.

ONIOPHYLLUM Edwards and Haime.Genotype: *Turbinolia pyramidalis* Hisinger.

Goniophyllum Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal., 1851 (Arch. Mus. Hist. Nat., 5), pp. 169, 404.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 456.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 397.—Lindstrom, Geol. Mag., 3, 1866, pp. 357, 411.—Salter, Cat. Camb. Sil. Foss., 1873, p. 114.—Dybowski, Archiv. f. Natur. Liv.-Ebst-und Kurl., 5, 1873, p. 340.—Zittel, Handb. Pal., 1, 1879, p. 235.—Lindstrom, Bihang till K. Sv. Vet.-Akad. Handl., 7, 1882, p. 42.—Roemer, Leth. Geog., pt. 1, Leth. Pal., 1883, p. 406.—Sherzer, Amer. Geol., 7, 1891, pp. 296-301.—Koken, Die Leitfossilien, Leipzig, 1896, p. 313.—Weller, Jour. Geol., 6, 1896, p. 700; Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 20; Zittel-Eastman Textb. Pal., 1, 1900, p. 79; *ibid.*, 2d ed., 1913, p. 87.

***Goniophyllum pyramidale* (Hisinger).**

Turbinolia turbinata var. *pyramidalis* Hisinger, Tableau des petrif. de Suede, 1st ed., 1829, p. 22.

Turbinolia pyramidalis Hisinger, Tableau des petrif. de Suede, 2d ed., 1831, p. 26; Lethæa, 1838, p. 101, pl. 28, fig. 12.

Goniophyllum pyramidale Milne-Edwards and Haime, Polypiers fossiles, 1851, p. 404, pl. 2, figs. 4, 4a.—Lindstrom, Öfvers. Vet.-Akad. Forhandl., 1865, p. 271, pl. 30, figs. 1-9; Bihang till K. Sv. Vet.-Akad. Handl., 7, 1882, p. 43, pls. 1, 5, 6, 7, 8, 9 (see for complete bibliography).—Winchell, Amer. Geol., 6, 1890, p. 326.—Weller and Davidson, Jour. Geol., 4, 1896, p. 170, pl. 6, figs. 6-8.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 19, fig. 5.

Cyathophyllum tetragonum Quenstedt, Handb. der Petrefaktenkunde, Ab. 1, 6, 1879, p. 407, pl. 156, figs. 82-85.

Silurian: Island of Gotland; England; La Motte, Dubuque County, Iowa (Niagaran).

GONTOSTROPHA (part) Ehlert. See *Hormotoma* Salter.

GONIOTRYPA Ulrich.Genotype: *G. bilateralis* Ulrich.

Goniotrypa Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 40.—Miller, N. A. Geol. Pal., 1889, p. 307.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 339.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 545.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 49.

***Goniotrypa bilateralis* Ulrich.**

Goniotrypa bilateralis Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 41, figs. 1-3, pl. 9, fig. 1.—Miller, N. A. Geol. Pal., 1889, fig. 481 (p. 307).—Whiteaves, Pal. Foss., 3, 1895, p. 118.

Richmond: Stony Mountain, Manitoba (Stony Mountain); Island of Anticosti (Charleton).

Cotypes.—Cat. No. 43475, U.S.N.M.

GONIURUS Raymond.Genotype: *Bathyrurus perspicator* Billings.

Goniurus Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 65.

***Goniurus caudatus* (Billings).**

Bathyrurus caudatus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 261, fig. 245.

Goniurus caudatus Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 66.

Canadian: Port aux Choix, Newfoundland (Quebec—G., H.); Fort Cassin, Vermont; and Ticonderoga, New York (Beekmantown).

Goniurus elongatus Raymond.

Goniurus elongatus Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 64, pl. 7, figs. 11, 12.

Canadian: Beekmantown): Philipsburg and St. Armond, Missisquoi County, Quebec.

Goniurus perspicator (Billings).

Bathyrurus perspicator Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 36, fig. 191.

Goniurus perspicator Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 64, pl. 7, fig. 10.

Canadian (Beekmantown): St. Antoine, above Quebec, Canada.

GORGONIA Hall. See *Chasmatopora* Eichwald.**Gorgonia anticorum** Castelnau.

Not recognized

Gorgonia anticorum Castelnau, Syst. Sil., 1843, p. 50, pl. 24, fig. 1.

Silurian: Lake Huron.

GORGONIA ASPERA Hall. See *Chasmatopora aspera*.**GORGONIA FLABELLIFORMIS** Eichwald. See *Dictyonema flabelliforme*.**Gorgonia infundibuliformis** Eaton.

Not recognized

Gorgonia infundibuliformis Eaton, Geol. Textbook, ed. 2, 1832, p. 43, pl. 4, fig. 4.

GORGONIA PERANTIQUA Hall. See *Protocrisina perantiqua*.**GORGONIA PROAVUS** Eichwald. See *Graptodictya proava*.**GORGONIA? RETEFORMIS** Hall. See *Dictyonema retiforme*.**Gorgonia siluriana** Castelnau.

Not recognized

Gorgonia siluriana Castelnau, Syst. Sil., 1843, p. 50.

Silurian: Lake Huron.

GOTLANDIA Dall. See *Trimerella* Billings.**GRAMMYSIA** Verneuil.

Genotype: *G. hamiltonensis* Verneuil.

Grammysia Verneuil, Bull. Geol. Soc. France (2) 4, 1847, p. 696.—Pictet, *Traité de Pal.*, 2d ed., 3, 1855, p. 530.—Barrande, *Syst. Sil. du Centre Bohème*, 6, 1881, p. 85; *Acephales*: Ext. *Syst. Sil. du Centre Bohème*, 1881, p. 135.—Zittel, *Handb. Pal.*, 2, 1881, p. 128.—Hall, *Pal. New York*, 5, pt. 1, *Lam.* 2, 1885, p. 30.—Miller, *N. A. Geol. Pal.*, 1889, p. 482.—Nettelroth, *Kentucky Foss. Shells*, Geol. Surv. Kentucky, 1889, p. 207.—Koken, *Die Leitfossilien, Leipzig*, 1896, p. 525.—Grabau, *Bull. Buffalo Soc. Nat. Sci.*, 6, 1899, p. 260.—Dall, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 439.

Grammysia acadica Billings.

Grammysia Acadica Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 14, pl. 9, fig. 4, 4a.

Silurian (Moydart, Stonehouse): Arisaig, Nova Scotia.

Grammysia? arctica Bassler (new name).

Grammysia? triangulata Høltedahl (not Williams, 1913), 2d *Arct. Exp. Foss.* 1898–1902, No. 32, 1914, p. 28, pl. 8, fig. 8.

Helderbergian (Lower beds): Southwestern Ellesmereland, Arctic America.

GRAMMYSIA CASWELLI Foerste. See *Cuneamys? caswelli*.**GRAMMYSIA CINGULATA TRIANGULATA** McCoy. See *Grammysia triangulata*.

GRAMMYSIA NEGLECTA Hall and Whitfield. See *Cuneamya neglecta*.

Grammysia pembrockensis Williams.

Grammysia pembrockensis Williams, Proc. U. S. Nat. Mus., 45, 1913, p. 344, pl. 31, fig. 2.

Silurian (Pembroke): Pembroke, Washington County, Maine.

Holotype.—Cat. No. 58968, U.S.N.M.

Grammysia remota Billings.

Grammysia remota Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 50, 1874, p. 139, pl. 9, fig. 2.

Silurian: Arisaig, Nova Scotia.

Grammysia rustica Billings.

Grammysia rustica Billings, Pal. Foss., Geol. Surv. Canada, 2, pt. 1, 1874, p. 139, pl. 9, fig. 3.

Silurian (Stonehouse): Arisaig, Nova Scotia.

Grammysia triangulata (Salter).

Orthonota triangulata Salter, Mem. Geol. Surv. Great Britain, 1848, 2, pt. 1, Pal. app., p. 361, pl. 18, fig. 7.

Grammysia cingulata var. *triangulata* McCoy, British Pal. Foss., 1855, p. 280, pl. 1k, fig. 28.

Grammysia triangulata Williams, Proc. U. S. Nat. Mus., 45, 1913, p. 345, pl. 31, fig. 17.

Silurian: Great Britain; Long Cove, Washington County, Maine (Pembroke).

Plesiotype.—Cat. No. 58970, U.S.N.M.

GRAMMYSIA? TRIANGULATA Hortedahl. See *Grammysia arctica*.

GRAPTODICTYA Ulrich.

Genotype: *Ptilodictya perelegans* Ulrich.

Graptodictya Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, pp. 151, 165.—Miller, N. A. Geol. Pal., 1889, p. 307.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 393.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 14.—Simpson, 14th Ann. Rep. New York State Geol. for 1894, 1897, p. 541.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 46.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 747.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 121.

GRAPTODICTYA NITIDA Ulrich. See *Graptodictya perelegans*.

Graptodictya perelegans (Ulrich).

Ptilodictya perelegans Ulrich, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 94, pl. 4, figs. 16, 16a.

Graptodictya perelegans Ulrich, *ibid.*, 5, 1882, p. 165, pl. 8, fig. 5.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 122, fig., p. 121.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 280.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 836, pl. 29, fig. 8.

Graptodictya nitida Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, p. 166, pl. 7, figs. 8, 8a.

Richmond (Waynesville, Liberty): Clarkesville, etc., Ohio; Indiana.

Holotypes.—Cat. Nos. 43274, 43661, U.S.N.M.

Graptodictya proava (Eichwald).

Gorgonia proavus Eichwald, Urwelt Russlands, 2, 1840, p. 44, pl. 1, fig. 5.

Coccinium proavus Eichwald, Leth. Rossica, 1, 1860, p. 398.

Coccinium proavium Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 158, fig. 122.

Graptodictya proava—Continued.

Graptodictya proava Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 123-126, figs. 49, 50; pl. 8, fig. 2; pl. 9, figs. 1-6.

Clathropora flabellata Hall, Foster and Whitney's Rep. Geol. Lake Superior Land Dist., pt. 2, 1851, p. 207, pl. 24, figs. 2a, b.

Stictoporella flabellata Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 416.

Stictoporella cribrosa Sardeson (not Ulrich), Jour. Geol., 9, 1901, p. 157, pl. B, figs. 7-9.

Middle Ordovician: Uxnorn, Esthonia, Russia (Wassaleem); Kenyon, Minnesota and Escanaba River, Michigan (Trenton).

Plesiotype.—Cat. No. 57216, U.S.N.M.

GRAPTOLITES (DIDYMOGRAPTUS) BRYONOIDES McCoy. See *Tetragraptus serra*.

GRAPTOLITES (DIDYMOGRAPTUS) CADUCEUS McCoy. See *Didymograptus (Isograptus) caduceus*.

GRAPTOLITES DENTATUS Vanuxem. See *Glossograptus (Orthograptus) quadrimacronatus*.

GRAPTOLITES (DIDYMOGRAPTUS) EXTENSUS McCoy. See *Didymograptus extensus*.

GRAPTOLITES (DIDYMOGRAPTUS) FRUTICOSUS McCoy. See *Tetragraptus fruticosus*.

GRAPTOLITES (DIDYMOGRAPTUS) LOGANI McCoy. See *Loganograptus logani*.

GRAPTOLITES NILSSONI Harkness. See *Monograptus gregarius*.

GRAPTOLITES (DIDYMOGRAPTUS) OCTOBRACHIATUS McCoy. See *Dichograptus octobrachiatus*.

GRAPTOLITES PRIODON of authors. See *Monograptus priodon*.

GRAPTOLITES PRISTIS (part) of authors. See *Diplograptus foliaceus*.

GRAPTOLITES (DIDYMOGRAPTUS) QUADRIBRACHIATUS McCoy. See *Tetragraptus quadribachiatus*.

GRAPTOLITES (DIDYMOGRAPTUS) THUREAUI McCoy. See *Goniograptus thureaui*.

GRAPTOLITES VENOSUS Hall. See *Retiolites geinitzianus venosus*.

GRAPTOLITHUS ABNORMIS Hall. See *Clonograptus abnormis*.

GRAPTOLITHUS ACUTUS Hopkinson. See *Monograptus intermedius*.

GRAPTOLITHUS ALATUS Hall. See *Tetragraptus alatus*.

GRAPTOLITHUS AMPLEXICAULE Hall. See *Diplograptus (Glyptograptus) amplexicaule*.

GRAPTOLITHUS ANGUSTIFOLIUS Hall. See *Diplograptus (Glyptograptus) angustifolius*.

GRAPTOLITHUS ANNECTANS Walcott. See *Leptograptus annectans*.

GRAPTOLITHUS ARCUATUS Hall. See *Didymograptus arcuatus*.

GRAPTOLITHUS ARUNDINACEUS Hall. See *Mastigograptus arundinaceus*.

GRAPTOLITHUS BICORNIS Hall. See *Climacograptus bicornis*.

GRAPTOLITHUS BIFIDUS Hall. See *Didymograptus bifidus*.

- GRAPTOLITHUS BIGSEYI* Hall. See *Tetragraptus similis*.
- GRAPTOLITHUS BRYONOIDES* Hall. See *Tetragraptus amii* and *T. serra*.
- GRAPTOLITHUS CADUCEUS* Chapman. See *Didymograptus (Isograptus) caduceus*.
- GRAPTOLITHUS CLINTONENSIS* Hall. See *Monograptus clintonensis*.
- GRAPTOLITHUS CONSTRICTUS* Hall (part). See *Didymograptus extensus* and *D. hirundo*.
- GRAPTOLITHUS CONVOLUTUS* Carruthers. See *Monograptus convolutus*.
- GRAPTOLITHUS CRUCIFER* Hall. See *Tetragraptus crucifer*.
- GRAPTOLITHUS DENTATUS* D'Orbigny. See *Diplograptus foliaceus*.
- GRAPTOLITHUS DENTICULATUS* Hall. See *Tetragraptus denticulatus*.
- GRAPTOLITHUS DIVARICATUS* Hall. See *Dicellograptus divaricatus*.
- GRAPTOLITHUS DIVERGENS* Hall. See *Amphigraptus divergens*.
- GRAPTOLITHUS ENSIFORMIS* Hall. See *Trigonograptus ensiformis*.
- GRAPTOLITHUS EXTENSUS* Hall. See *Didymograptus extensus*.
- GRAPTOLITHUS EXTENUATUS* Hall. See *Didymograptus extenuatus*.
- GRAPTOLITHUS FLACCIDUS* Hall. See *Leptograptus flaccidus*.
- GRAPTOLITHUS FLEMINGII* Salter. See *Monograptus flemingii*.
- GRAPTOLITHUS (DICHOGRAPTUS) FLEXILIS* Hall. See *Clonograptus flexilis*.
- GRAPTOLITHUS FOLIACEUS* Murchison. See *Diplograptus foliaceus*.
- GRAPTOLITHUS FOLIUM* Salter. See *Diplograptus foliaceus*.
- GRAPTOLITHUS FRUTICOSUS* Hall. See *Tetragraptus fruticosus*.
- GRAPTOLITHUS FURCATUS* Hall. See *Dicranograptus furcatus*.
- GRAPTOLITHUS GRACILIS* Hall. See *Nemagraptus gracilis* and *N. gracilis surcularis*.
- GRAPTOLITHUS HEADI* Hall. See *Tetragraptus headi*.
- GRAPTOLITHUS (DIPLOGRAPTUS) HYPNIFORMIS* White. See *Diplograptus foliaceus*.
- GRAPTOLITHUS INDENTUS* Hall. See *Didymograptus indentus*.
- GRAPTOLITHUS INTERMEDIUS* Carruthers. See *Monograptus intermedius*.
- GRAPTOLITHUS LAEVIS* Hall. See *Phycograptus laevis*.
- GRAPTOLITHUS LOGANI* Hall. See *Loganograptus logani*.
- GRAPTOLITHUS MARCIDUS* Hall. See *Cryptograptus tricornis*.
- GRAPTOLITHUS MILESI* Hall. See *Clonograptus milesi*.
- GRAPTOLITHUS MUCRONATUS* Hall. See *Lasiograptus mucronatus*.
- GRAPTOLITHUS MULTIFASCIATUS* Hall. See *Amphigraptus multifasciatus*.
- GRAPTOLITHUS MULTIFASCICULATUS* Leale. See *Amphigraptus multifasciatus*.
- GRAPTOLITHUS NITIDUS* Hall. See *Didymograptus nitidus*.

GRAPTOLITHUS OCTOBRACHIATUS Hall. See *Dichograptus octobrachiatus*.

GRAPTOLITHUS OCTONARIUS Hall. See *Dichograptus octonarius*.

GRAPTOLITHUS PATULUS Hall. See *Didymograptus patulus*.

GRAPTOLITHUS PENNATULUS Hall. See *Didymograptus pennatulus*.

GRAPTOLITHUS (DIPLOGRAPTUS) PEOSTA Hall. See *Diplograptus peosta*.

GRAPTOLITHUS PRIODON Barrande. See *Monograptus priodon*.

GRAPTOLITHUS PRIODON Chapman. See *Monograptus clintonensis*.

GRAPTOLITHUS PRISTINIFORMIS Hall. See *Diplograptus dentatus*.

GRAPTOLITHUS PRISTIS Hall (part). See *Diplograptus foliaceus*, *D. foliaceus acuta*, *D. foliaceus incisus*, *Glossograptus* (*Orthograptus*) *quadrimumcronatus*, and *Diplograptus peosta*.

GRAPTOLITHUS PUTILLUS Hall. See *Climacograptus* (*Mesograptus*) *putillus*.

GRAPTOLITHUS QUADRIBRACHIATUS Hall. See *Tetragraptus quadribrachiatum*.

GRAPTOLITHUS QUADRIMUMCRONATUS Hall. See *Glossograptus* (*Orthograptus*) *quadrimumcronatus*.

GRAPTOLITHUS RAMOSUS Salter. See *Dicranograptus rectus*.

GRAPTOLITHUS (DIPLOGRAPTUS) RAMOSUS Chapman. See *Dicranograptus ramosus*.

GRAPTOLITHUS RAMULUS Hall. See *Temnograptus?* *ramulus*.

GRAPTOLITHUS (CLIMACOGRAPTUS) RAMULUS White. See *Dicranograptus nicholsoni whitianus*.

GRAPTOLITHUS RICHARDSONI Hall. See *Holograptus?* *richardsoni*.

GRAPTOLITHUS RIGIDUS Hall. See *Clonograptus rigidus*.

GRAPTOLITHUS SAGITTARIUS Hisinger. See *Didymograptus sagitticaulis*.

GRAPTOLITHUS (PRIONODUS) SEDGWICKII DISTANS. See *Monograptus distans*.

GRAPTOLITHUS (MONOPRION) SERRATULUS Hall. See *Didymograptus serratulus*.

GRAPTOLITHUS SEXTANS Hall. See *Dicellograptus sextans* and *D. sextans exilis*.

GRAPTOLITHUS SIMILIS Hall. See *Didymograptus similis*.

GRAPTOLITHUS SPINULOSUS Lapworth. See *Glossograptus ciliatus*.

GRAPTOLITHUS SUBTENUIS Hall. See *Didymograptus subtenuis*.

GRAPTOLITHUS TENTACULATUS Hall. See *Retiograptus tentaculatus*.

GRAPTOLITHUS TENUIS Portlock (part). See *Leptograptus annectans* and *Didymograptus subtenuis*.

GRAPTOLITHUS WHITFIELDI Hall. See *Glossograptus whitfieldi* and *Lesiograptus bimucronatus*.

GRAPTOLITHUS WHITIANUS Miller. See *Dicranograptus nicholsoni whitianus*.

GRAPTOPORA SOCIALIS Salter. See *Dictyonema flabelliforme*.

GRAPTOSPONGIA Ruedemann.Genotype: *G. pusilla* Ruedemann.*Graptospongia* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 485.**Graptospongia pusilla** Ruedemann.*Graptospongia pusilla* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 485, figs. 467, 468.

Chazyan (Normanskill): Schuylerville, Saratoga County, New York.

GREENFIELDIA Grabau. See *Hindella* subgenus *Greenfieldia*.**HYPIDIA UNGUIFORMIS** Ulrich. See *Conchidium unguiforme*.**HYPIDULA** Dalman. See *Conchidium* Linnæus.**GYPIDULA** Hall.Genotype: *Pentamerus occidentalis* Hall.*Gypidula* Hall, 20th Rep. New York State Cab. Nat. Hist., 1867, p. 163; Pal. New York, 4, 1867, pp. 373, 380.—Zittel, Handb. Pal., 1, 1880, p. 694.—Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 161.—Miller, N. A. Geol. Pal., 1889, p. 346.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 322.*Sieberella* Ehlert, Fischer's Man. Conch., 1887, p. 1311.*Gypidula* and *Sieberella* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 245; 13th Ann. Rep. New York State Geol., 1895, pp. 845, 846.**Gypidula (Sieberella) coeymanensis corriganensis** Maynard.*Gypidula (Sieberella) coeymanensis* var. *corriganensis* Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 345, pl. 62, figs. 12-18.

Helderbergian (Keyser): Devils Backbone, near Cumberland, Maryland; Keyser, West Virginia.

Gypidula (Sieberella) coeymanensis prognostica Maynard.*Gypidula (Sieberella) coeymanensis* var. *prognostica* Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 344, pl. 62, figs. 9-11.—Holtedahl, Second Arct. Exped. "Fram," 1898-1902, No. 32, 1914, p. 21, pl. 7, fig. 5.

Helderbergian (Keyser): Pinto, Cumberland, Hancock, etc., Maryland; Keyser, West Virginia; Hyndman, Pennsylvania; Southwestern Ellesmereland, Arctic America.

Gypidula coppingeri (Etheridge).*Pentamerus coppingeri* Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 594, pl. 25, figs. 2, 3.*Gypidula coppingeri* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 226.

Niagaran: Offley Island, Arctic America.

Gypidula (Sieberella) galeata (Dalman).*Atrypa galeata* Dalman, Kongl. Svenska, Vet.-Akad. Handl., för 1827, 1828, p. 46, pl. 5, fig. 4.—Troost, 6th Geol. Rep. Tennessee, 1841, p. 15.—Vanuxem, Geol. New York, Rep. 3d Dist., 1842, p. 117, fig. 1.—Castelnau, Essai Syst. Sil. l'Amérique Septentrionale, 1843, p. 39, pl. 14, fig. 4.*Pentamerus galeatus* Hall, 10th Rep. New York State Cab. Nat. Hist., 1857, p. 105, figs. 1-3.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 825, fig. 646.—Hall, Pal. New York, 3, 1859, p. 257, pl. 46, fig. 1; pl. 47, fig. 1.—Billings, Geol. Canada, 1863, p. 957, fig. 454.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 616, fig.—Sherzer, Michigan Geol. Surv., 7, 1900, pt. 1, p. 224.*Pentamerus galeatus* var. *Whiteaves*, Cont. to Canadian Pal., 1, 1891, p. 234.*Sieberella galeatus* Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 246, figs. 175; pl. 72, figs. 7-13.

Gypidula (Sieberella) galeata—Continued.

Gypidula (Sieberella) galeatus Kindle and Breger, 28th Ann. Rep. Dep., Geol. Nat. Res. Indiana, 1904, p. 437, pl. 2, figs. 20, 21, 23–29.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 278, fig. 388.

Devonian: Europe; New York; Maryland; Pennsylvania; New Brunswick; etc. Identified in Niagaran at Delphi, Indiana, and in the Monroan of Michigan, both probably erroneously.

Gypidula globulosa (Nettelroth).

Pentamerus globulosus Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 54.

Gypidula globulosa Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 226.

Niagaran (Louisville): Louisville, Kentucky.

Cotypes.—Cat. No. 51339, U.S.N.M.

Gypidula knotti (Nettelroth).

Pentamerus knotti Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 56, pl. 32, figs. 9–12.

Gypidula knotti Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 226.

Niagaran (Louisville): Louisville, Kentucky.

Holotype.—Cat. No. 51354, U.S.N.M.

Gypidula (Sieberella) nucleus (Hall and Whitfield).

Pentamerus galeatus Hall and Whitfield, 24th Rep. New York State Cab. Nat. Hist., 1872, pp. 197, 200a.

Pentamerus nucleus Hall and Whitfield, 27th Rep. New York State Cab. Nat. Hist., 1875, pl. 9, figs. 30–32.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 59, pl. 27, figs. 25–27; pl. 33, figs. 27–33.

Sieberella nucleus Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 247, pl. 72, figs. 1–3.

Gypidula nucleus Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 226.

Gypidula (Sieberella) nucleus, Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 438, pl. 2, figs. 18, 19.

Niagaran: Louisville, Kentucky (Louisville); Georgetown, Indiana.

Plesiotypes.—Cat. No. 51328, U.S.N.M.

Gypidula (Sieberella) roemerii (Hall and Clarke).

Pentamerus galeatus Roemer (not Dalman), Sil. Fauna West. Tennessee, 1860, p. 73, pl. 5, fig. 14.

Sieberella roemerii Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 247, pl. 72, fig. 6; 48th Rep. New York State Mus., 2, 1897, p. 370, pl. 13, fig. 4; 14th Rep. State Geol. New York for 1894, 1897, p. 370, pl. 13, fig. 4.

Gypidula roemerii Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 227.—Foerste, Jour. Geol., 11, 1903, p. 711 (loc. occ.); Bull. Sci. Lab. Denison Univ., 14, 1909, p. 70, pl. 3, fig. 51C.

Niagaran: Decatur County, Tennessee (Brownspout); ?Newsom, Tennessee (Waldron).

Gypidula simplex Foerste.

Gypidula simplex Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 70, pl. 3, figs. 51A, B.

Niagaran (Waldron): Newsom, Tennessee.

Gypidula subglobosa Maynard.

Gypidula subglobosa Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 346, pl. 62, figs. 20–22.

Helderbergian (Keyser): Cash Valley, near Cumberland, Maryland.

Gypidula (Sieberella) uniplicata (Nettelroth).

Pentamerus uniplicatus Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 63, pl. 33, figs. 25, 26.

Sieberella uniplicata Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 247.

Gypidula uniplicata Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 226.

Niagaran (Louisville): Louisville, Kentucky.

Holotype.—Cat. No. 51337, U.S.N.M.

GYROCERAS Dekoninck.

Genotype: *G. paradoxicum* Dekoninck.

Gyroceras Dekoninck, Desc. Animaux Fossiles, Liege, 1842, p. 530.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 27.—Woodward, Man. Mollusca, pt. 1, 1851, p. 91, fig. 52.—Saemann, Palaeontographica, 3, 1852, pp. 139, 159.—Barrande, Neues Jahrb. f. Min., 1854, etc., p. 7, pl. 1, figs. 4a, b.—Pictet, Traite de Pal., 2d ed., 2, 1854, p. 651.—Barrande, Neues Jahrb. f. Min., etc., 1855, p. 259; Bull. Soc. Geol. France, 2d ser., 12, 1855, p. 159, pl. 5, fig. 7.—Billings, Canadian Nat. Geol., 2, 1857, p. 136, pl. 2, fig. 5.—Chapman, Canadian Jour., n. s., 2, 1857, p. 266.—Salter, Geol. Surv. Canada, dec. 1, 1859, pp. 31, 32.—Barrande, Syst. Sil. du Centre Boheme, 2, pt. 1, 1867, p. 156.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th Ser., 1, 1879, p. 64.—Hall, Pal. New York, 5, pt. 2, 1879, pp. 358, 368, 389.—Koninck, Ann. d. Mus. Royal d'Hist. Nat. de Belgique, 5, 1880, p. 1.—Blake, Mon. British Foss. Ceph., 1882, p. 65.—Zittel, Handb. Pal., 2, 1884, p. 376.—Miller, N. A. Geol. Pal., 1889, p. 441.—Whidborne, Mon. Dev. Fauna South England, 1, Pal. Soc., 1890, p. 90.—Foord, Cat. Foss. Ceph. British Mus., 2, 1891, p. 53.—Koken, Die Leitfossilien, Leipzig, 1896, p. 50, fig. 34.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 1027.

Gyroceras abruptum Hall.

Gyroceras abruptum Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 325; Trans. Albany Inst., 10, 1883, p. 75

Niagaran (Waldron): Waldron, Indiana.

Gyroceras americanum Billings.

Gyroceras (Lituities) americanum Billings, Geol. Surv. Canada, Rep. Progr. for 1853-1856, 1857, p. 309.

Trochoceras americanum? Foord, Cat. Foss. Ceph. British Mus., 2, 1891, p. 40. Silurian: Port Daniel, Gaspe, Canada.

Gyroceras baeri (Meek and Worthen).

Trochoceras? *Baeri* Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 263.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 157, pl. 13, fig. 9.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 133.

Lituities baeri James, J. F., Jour. Cincinnati Soc. Nat. Hist., 8, 1886, p. 248.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1228, figs.

Gyroceras baeri Miller, N. A. Geol. Pal., 1889, p. 441 (gen. ref.).—Cumings, 32d Ann. Rep. Dep. Geol. and Nat. Res. Indiana, 1908, p. 1032, pl. 51, fig. 1.

Richmond (Liberty): Richmond, etc., Indiana; Warren and Clinton Counties, Ohio.

Gyroceras bannisteri Winchell and Marcy.

Gyroceras bannisteri Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 102.

Trochoceras (*Gyroceras*) *bannisteri* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, pp. 261, 393; rev. ed., 1870, p. 403, pl. 25, fig. 17.

Niagaran (Racine): Chicago, Illinois; Wisconsin.

Gyroceras duplcostatum Whitfield.

Gyroceras duplcostatum Whitfield, Ann. Rep. Geol. Surv. Wisconsin for 1877, 1878, p. 78; Geol. Wisconsin, 4, 1882, p. 235, pl. 7, fig. 1.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 159, fig.—Clarke, Geol. Minnesota, 3, pt. 2, 1897, p. 811. Black River (Platteville): Beloit, Janesville, etc., Wisconsin.

Gyroceras elrodi White.

Gyroceras elrodi White, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 356, pl. 37, fig. 1; pl. 38, figs. 2-4.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4. 1889, p. 268, figs.
Barrandeoceras elrodi Miller, N. A. Geol. Pal., 2d App., 1897, p. 771 (gen. rel.). Niagaran (Laurel): Hartsville, Indiana.

Gyroceras farcimen Clarke and Ruedemann.

Gyroceras farcimen Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 92, pl. 18, figs. 1-4.
 Niagaran (Guelph): Shelby, New York.

GYROCERAS HERCULES Chamberlin. See *Protophragnoceras hercules*.

GYROCERAS (LITUITES) MAGNIFICUM Billings. See *Apsidoceras magnificum*.

GYROCERAS PARADOXICUM Hall. See *Orthoceras paradoxicum*.

Gyroceras rhombolineare Owen.

Not recognized.

Gyroceras rhombolinearis Owen, Geol. Surv. Indiana, 1862, p. 362, fig. 4.
 Silurian: Locality not given.

GYROCERAS (LITUITES) VAGRANS Billings. See *Barrandeoceras vagrans*.

GYRONEMA Ulrich.

Genotype: *G. pulchellum* Ulrich and Scofield.

Gyronema (subgenus of *Trochonema*) Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1054.—Koken, Neues Jahrb. f. Min., Geol. Pal., 1, 1898, p. 24.

Gyronema brevispira Whiteaves.

Gyronema brevispira Whiteaves, Geol. Surv. Canada, Ann. Rep., n. s., 14, 1904, App. F, p. 51; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 259, pl. 29, fig. 4.
 Niagaran: Ekwan River, Canada.

Gyronema dowlngii Whiteaves.

Gyronema Dowlngii Whiteaves, Geol. Surv. Canada, Ann. Rep., n. s., 14, App. F, 1904, p. 50; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 259, pl. 29, fig. 3.
 Niagaran: Ekwan River, Canada.

Gyronema duplicatum Ulrich and Scofield.

Gyronema duplicatum Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1055, pl. 78, figs. 22-25.
Trochonema (*Gyronema*) *duplicatum* Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 671, fig. 928g, h.
 Black River (Platteville): Beloit, etc., Wisconsin; Dixon, Illinois.
 Cotype.—Cat. No. 45823, U.S.N.M.

Gyronema historicum (Hudson).

Eunema historicum Hudson, Bull. New York State Mus., 80, 1905, p. 288, pl. 4, fig. 5.
Gyronema historicum Raymond, Ann. Carnegie Mus., 4, 1908, p. 208, pl. 54, figs. 5, 6.
Cyclonema? *normaliana* Raymond, Amer. Jour. Sci., 4th Ser., 20, 1905, p. 377.
 Chazy (Valcour): Valcour Island and Plattsburg, New York.

***Gyronema leptototum* (Raymond).**

Eunema leptototum Raymond, Amer. Jour. Sci., 4th ser., 20, 1905, p. 378.

Gyronema leptototum Raymond, Ann. Carnegie Mus., 4, 1908, p. 209, pl. 55, fig. 15.

Chazy (Day Point): Chazy, New York.

***Gyronema liratum* Ulrich and Scofield.**

Gyronema liratum Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1056, pl. 78, fig. 14-16.

Trochonema (*Gyronema*) *liratum* Grabau, Amer. Nat., 36, 1902, p. 925.

Black River (Platteville): Beloit, Wisconsin.

Holotype.—Cat. No. 45824, U.S.N.M.

***Gyronema microclathratum* (Hudson).**

Holopea microclathrata Hudson, Bull. New York State Mus., 80, 1905, p. 294, pl. 4, figs. 3, 4.

Gyronema microclathratum Raymond, Ann. Carnegie Mus., 4, 1908, p. 210.

Chazy (Valcour): Valcour Island, New York.

***Gyronema percarinatum* (Hall).**

Pleurotomaria percarinata Hall, Pal. New York, 1, 1847, p. 177, pl. 38, fig. 4; 12th Rept. New York State Cab. Nat. Hist., 1855, p. 74.—Emmons, Amer. Geol., 1, pt. 2, 1855, p. 160, pl. 5, fig. 7.

Cyclonema percarinata Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 321.—Whitfield, Geol. Wisconsin, 4, 1882, p. 211, pl. 5, fig. 15.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 157, fig.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 172, fig.

Trenton: Middleville, New York.

***Gyronema pulchellum* Ulrich and Scofield.**

Gyronema pulchellum Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1054, pl. 78, figs. 19-21.

Trochonema (*Gyronema*) *pulchellum* Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 671, fig. 928e, f.

Black River: Minneapolis, Chatfield, etc., Minnesota (Decorah); Mercer County, Kentucky.

Cotypes.—Cat. No. 45825, U.S.N.M.

***Gyronema? rotalineum* Raymond.**

Gyronema? rotalineum Raymond, Ann. Carnegie Mus., 3, 1906, p. 577; *ibid.*, 4, 1908, p. 210, pl. 54, fig. 4.

Chazy (Crown Point): Sloop Bay, Valcour Island, New York.

***Gyronema semicarinatum* (Salter).**

Cyclonema semicarinata Salter, Geol. Surv. Canada, Can. Org. Rem., dec. 1, 1859, p. 27, pl. 6, figs. 2, 2a (not 2b).—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 145, fig. 90.—Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 343.

Gyronema semicarinatum Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1055, pl. 78, figs. 17, 18.

Black River: Allumette Island, Ottawa River, Canada (Leray); near Cannon Falls, Minnesota (Decorah).

Plesiotypes.—Cat. No. 45826, U.S.N.M.

Gyronema speciosum Whiteaves.

Gyronema speciosum Whiteaves, Geol. Surv. Canada, Ann. Rep., n. s., 14, App. F, 1904, p. 50; Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 258, pl. 2, fig. 2.

Niagaran: Ekwan River, Canada.

HABROCRINUS D'Orbigny.

Genotype: *H. pusillus* D'Orbigny.

Abrocrinus D'Orbigny, Prodrome Pal. Strat., 1, 1844, pp. 47-146; Cours Elementaire de Pal., Geol., 2, 1851, p. 144.

Habrocrinus Angelin, Icon. Crin. Suec., 1878, p. 3.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 279 (Rev. Pal., pt. 2, p. 195).

Habrocrinus benedicti (Miller).

Saccocrinus benedicti Miller, 18th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1894, p. 283, pl. 5, fig. 1, 2 (adv. sheets, 1892).

Habrocrinus benedicti Slocom, Field Columbian Mus., 2, Geol. Ser., 1906, p. 295, pl. 87, figs. 6, 7.

Periechocrinus chicagensis Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, 1902, p. 131, pl. 13, figs. 7, 8.—Grabau and Shimer, N. A. Index Fossil, 2, 1910, p. 536.

Niagaran: St. Paul, Indiana (Laurel); Bridgeport and Joliet, Illinois (Racine).

Habrocrinus farringtoni Slocom.

Habrocrinus farringtoni Slocom, Field Columbian Mus. Geol., 2d ser., 2, 1906, p. 298, pl. 87, figs. 1-5.

Niagaran (Racine): Drainage Canal near Lemont, Illinois.

Habrocrinus howardi (Miller).

Saccocrinus howardi Miller, 18th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1894, p. 284, pl. 5, fig. 3-5 (adv. sheets, 1892); N. A. Geol. Pal., 1st App., 1892, p. 681, fig. 1244.

Periechocrinus Howardi Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 21, 1897, p. 529.

Habrocrinus howardi Slocom, Field Columbian Mus., 2, Geol. Ser., 1906, p. 296.

Niagaran (Laurel): St. Paul, Indiana.

Habrocrinus lemontensis Slocom.

Habrocrinus lemontensis Slocom, Field Columbian Mus., Geol. Ser., 2, 1906, p. 297, pl. 87, figs. 8-10.

Niagaran (Racine): Drainage Canal near Lemont, Illinois.

HABROCRINUS ORNATUS Wachsmuth and Springer. See *Periechocrinus ornatus*.**HALICHONDRITES** Dawson and Hinde.

Genotype: *H. confusus* Dawson and Hinde.

Halichondrites Dawson and Hinde, Canadian Rec. Sci., 3, 1888, p. 68.—Dawson, Trans. Roy. Soc. Canada, 7, sec. 4, 1890, p. 52.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 667.—Rauff, Neues Jahrb. Min., Geol. Pal., 2, 1893, p. 58.

Halichondrites confusus Dawson and Hinde.

Halichondrites confusus Dawson and Hinde, Trans. Roy. Soc. Canada, 7, sec. 4, 1890, p. 52, fig. 23.—Dawson, *ibid.*, 2d ser., 2, sec. 4, 1896, p. 116, fig. 26.

Canadian? (Levis?): Metis, Quebec.

HALLIA Edwards and Haime.

Genotype: *H. insignis* Edwards and Haime.

Hallia Edwards and Haime, Mon. Polyp. Foss. Terr. Pal., 1851 (Arch. du Mus. d'Hist. Nat., 5), pp. 165-353.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 453.—

HALLIA—Continued.

Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 356.—Ludwig, Palaeontographica, 14, 1865, p. 143, pl. 31, fig. 5.—Lindstrom, Geol. Mag., 3, 1866, p. 412.—Dybowski, Archiv. f. Naturf. Liv-, Ehst-und Kurl, 5, 1873, p. 337.—Zittel, Handb. Pal., 1, 1879, p. 230.—Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 411 (Ext., 1882, p. 7).—Frech, Zeits. d. Deutschen geol. Gesell., 37, 1885, p. 81; Pal. Anhandl., Dames and Kayser, 3, Heft 3, 1886, p. 81.—Miller, N. A. Geol. Pal., 1889, p. 191.—Sherzer, Amer. Geol., 7, 1891, pp. 290–295.—Koken, Die Leitfossilien, Leipzig, 1896, p. 472.

Hallia divergens Hall.

Hallia divergens Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 412 (Ext., 1882, p. 8).

Niagaran (Racine): Racine, Wisconsin.

Hallia divisa Hall.

Hallia divisa Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 412 (Ext., 1882, p. 8).

Niagaran: Louisville, Kentucky.

Hallia pluma Hall.

Hallia pluma Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 412 (Ext., 1882, p. 8).

Niagaran (Racine): Racine, Wisconsin.

Hallia scitula Hall.

Hallia scitula Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 411 (Ext., 1882, p. 7).

Niagaran: Louisville, Kentucky.

HALLICYSTIS Jaekel.

Genotype: *Apiocystites imago* Hall.

Apiocystites Hall (not Forbes nor Hall, 1852), 20th Rep. New York State Cab. Nat. Hist., rev. ed., 1868, p. 358.

Hallicystis Jaekel, Stammes. Palmat., Berlin, 1, 1899, p. 287.—Schuchert, Smith. Misc. Coll., 47, pt. 2, 1904, p. 216.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 154.

Hallicystis elongatus (Jaekel).

Hallicystis elongata Jaekel, Stammesg. d. Palmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 288.—Schuchert, Smiths. Misc. Coll., 47, pt. 2, 1904, p. 217.

Niagaran (Racine): Near Chicago, Illinois.

Hallicystis imago (Hall).

Apiocystites imago Hall, 18th Rep. New York State Cab. Nat. Hist., 1864, p. 10, pl. 3, fig. 12; pl. 1, fig. 9; 20th Rep. New York State Cab. Nat. Hist. (extras, 1864), 1868, p. 314, pl. 12 (3), fig. 12; pl. 12a (1) fig. 9; rev. ed., 1870, p. 358, pl. 12, fig. 12; pl. 12a, fig. 9.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 191, fig.

Hallicystis imago Jaekel, Stammes. Palmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 288, pl. 15, fig. 3.—Schuchert, Smiths. Misc. Coll., 47, pt. 2, 1904, p. 216, fig. 24.

Niagaran (Racine): Racine, Wisconsin; Chicago, Illinois.

Plesiotype.—Cat. No. 35060, U.S.N.M.

HALLIELLA Ulrich.

Genotype: *H. sculptilis* Ulrich.

Halliella Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 2, 1891, p. 184.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 707.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 656.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 346.

Halliella labiosa Ulrich.

Halliella labiosa Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 656, pl. 46, figs. 43-44.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 346, fig. 1658r, r.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 738, fig. 1425h.
Trenton (Prosser): Near Cannon Falls, Minnesota.
Cotypes.—Cat. No. 41361, U.S.N.M.

Halliella sculptilis (Ulrich).

Primitia? *sculptilis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1890, p. 124, pl. 8, fig. 6.
Halliella sculptilis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 656.
Trenton (Perryville): Perryville, Boyle County, Kentucky.
Holotype.—Cat. No. 41362, U.S.N.M.

Halliella? seminulum longa Ulrich and Bassler.

Halliella? *seminulum* var. *longa* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 520, pl. 95, fig. 16.
Helderbergian (Keyser): Cumberland, Maryland.
Holotype.—Cat. No. 53309, U.S.N.M.

Halliella? triplicata Ulrich and Bassler.

Halliella? *triplicata* Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 521, pl. 95, figs. 17, 18.
Helderbergian (Keyser): Cumberland, Maryland.
Holotype.—Cat. No. 53310, U.S.N.M.

HALLINA Winchell and Schuchert. See *Zygospira* Hall.

HALLOCERAS? HERCULES Grabau and Shimer. See *Protophragmoceras hercules*.

HALLOGRAPTUS BIMUCRONATUS Lapworth. See *Lasiograptus bimucronatus*.

HALLOPOREA Bassler.

Genotype: *Callopora elegantula* Hall.

Callopora Hall (not *Callopora* Gray, 1848), Pal. New York, 2, 1852, p. 144.—Nicholson, Pal. Province Ontario, 1874, p. 61; Geol. Mag., n. s., 1, 1874, p. 13.—Hall, 28th Ann. Rep. New York State Mus., 1879, p. 114.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, pp. 154, 251.—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 172.—Hall and Simpson, Pal. New York, 4, 1887, p. 15.—Miller, N. A. Geol. Pal., 1889, p. 295.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 372, 416; Geol. Minnesota, 1893, 3, p. 275; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 275.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 588.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, pp. 36, 186.—Grabau, Bull. Buffalo Nat. Sci., 7, 1901, p. 167; Bull. New York State Mus., 9, 1901, p. 167.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 741.—Bassler, Bull. U. S. Geol. Surv., 22, 1906, pp. 40.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 139.—Hennig, Archiv fur Zool., 4, 1908, p. 48.

Hallopora Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 325, 326; Zittel-Eastman Textb. Pal., 1913, p. 337.

Hallopora ampla (Ulrich).

Callopora ampla Ulrich, Geol. Minnesota, 3, 1893, p. 281, pl. 23, figs. 13-15, 18-20, 22, 23, 27, 28.

Black River (Decorah) and Trenton (Prosser): Ramsey, Goodhue, and Fillmore Counties, Minnesota; Decorah, Iowa.

Cotypes.—Cat. Nos. 43518, 45519, U.S.N.M.

***Hallopora andrewsi* (Nicholson).**

Chaetetes pulchellus (not of Milne-Edwards and Haime) Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 503, pl. 29, figs. 5-5b.—Nicholson, Pal. Ohio, 2, 1875, p. 195, pl. 21, figs. 5, 5a.

Monticulipora (*Heterotrypa*) *Andrewsii* Nicholson, Genus *Monticulipora*, 1881, p. 128, fig. 21, pl. 5, figs. 1, 1a.

Callopora andrewsi Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 252.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 187.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 785, pl. 8, figs. 9, 9a; pl. 27, fig. 7.

Monticulipora andrewsi (Van Cleve) Hall, 12th Ann. Rep. Indiana Geol. Nat. Hist., 1883, p. 249, pl. 11, fig. 9.—James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 178.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 419, figs.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 200.

Maysville (Bellevue and Corryville): Cincinnati, Ohio, and vicinity; south-eastern Indiana.

***Hallopora angularis* (Ulrich).**

Callopora angularis Ulrich, Geol. Minnesota, 3, 1893, p. 277, pl. 22, figs. 37-41.

Black River (Decorah): Minneapolis, Chatfield, and near Fountain, Minnesota. *Cotypes*.—Cat. No. 43520, U.S.N.M.

***Hallopora clausa* (Bassler).**

Callopora clausa Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 42, pl. 15, figs. 9-12.

Clinton: Lockport and Rochester, New York; Grimsby, Ontario (Rochester); Osgood, Indiana (Osgood).

Cotypes.—Cat. No. 35530, U.S.N.M.

***Hallopora dalei* (Milne-Edwards and Haime).**

Chaetetes Dalii Milne-Edwards and Haime, Pol. Foss. Terr. Pal., 1851, p. 266, pl. 19, figs. 6, 6a.

Monticulipora Dalii Milne-Edwards and Haime, British Foss. Corals, 1854, p. 265.—Milne-Edwards, Hist. Nat. des Corall., 3, 1860, p. 277.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 419, fig.

Monticulipora (*Heterotrypa*) *ramosa* var. *dalei* Nicholson, Genus *Monticulipora*, 1881, p. 115, fig. 19, C, D, pl. 2, 4.

Monticulipora ramosa var. *dalei* James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 182.—J. F. James, *ibid.*, 16, 1894, p. 205.

Chaetetes approximatus Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 502, pl. 29, fig. 3, 3a.—Nicholson, Pal. Ohio, 2, 1875, p. 193, pl. 21, fig. 3.

Monticulipora approximatus (Van Cleve) Hall, 12th Ann. Rep. Indiana Geol. Nat. Hist., 1883, p. 250, pl. 11, fig. 6.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 419.

Callopora dalei Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 252.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 188.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 139, fig. 194.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 792, pl. 8, fig. 11; pl. 27, fig. 12; Bull. Geol. Soc. Amer., 23, 1912, p. 367, pl. 19, figs. 7, 8.

Maysville: Cincinnati, Ohio, and vicinity (Mount Hope and Fairmount); Central Tennessee (Leipers).

***Hallopora dumalis* (Ulrich).**

Callopora dumalis Ulrich, Geol. Minnesota, 3, 1893, p. 282, pl. 23, figs. 1-8.

Hallopora dumalis Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 331, fig. 207.

Hallopora dumalls—Continued.

Black River (Decorah) and Trenton (Prosser): St. Paul and Cannon Falls, Minnesota.

Ordovician (Kuckers): Reval, Esthonia, Russia.

Cotypes.—Cat. No. 43517, U.S.N.M.

Hallopora elegantula (Hall).

Callopora elegantula Hall, Pal. New York, 2, 1852, p. 144, pl. 40, figs. a-m; 28th Ann. Rep. New York State Mus., 1879, p. 115; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 237.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 250, pl. 11, figs. 6-6b; Zittel's Textb. Pal. (Engl. ed.), 1896, figs. 456, A, B (p. 274).—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, pl. 18, figs. 1-7.—Grabau, Bull. New York State Mus., 45, 1901, p. 167, fig. 67; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 167, fig. 67.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 41, pl. 17, figs. 11-15; pl. 26, fig. 12.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 140, figs. 195a-b.

Hallopora elegantula Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 334, 335, fig. 210.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 337, figs. 491a, b.

Callopora nana Nicholson, Ann. Mag. Nat. Hist., 5th ser., 13, 1884, p. 120.

Niagaran: Lockport, Rochester, etc., New York; Ontario (Rochester); Waldron, Indiana; Newsom, Tennessee (Waldron); Osgood, Indiana (Osgood); Sterling, Illinois; Louisville, Kentucky; West Tennessee, etc. Wenlock shale of England and Gotland.

Plesiotypes.—Cat. Nos. 35528, 43648, U.S.N.M.

Hallopora frondosa (Cumings).

Callopora frondosa Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1906, p. 785, pl. 9, figs. 1, 1a.

Richmond (Whitewater): Richmond, Indiana.

Hallopora goodhuensis (Ulrich).

Callopora goodhuensis Ulrich, Geol. Minnesota, 3, 1893, p. 282, pl. 23, figs. 9, 10, 21, 29.

Hallopora goodhuensis Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 327, figs. 203, 204. Trenton (Prosser): St. Paul, Cannon Falls, etc., Minnesota.

Ordovician (Wassaleu and Wesenberg): Esthonia, Russia.

Cotypes and plesiotypes.—Cat. Nos. 43524, 57460, U.S.N.M.

Hallopora incontroversa (Ulrich).

Callopora incontroversa Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 96; Geol. Minnesota, 3, 1893, p. 278, pl. 22, figs. 33-36.

Black River (Decorah): Minneapolis, St. Paul, and Preston, Minnesota.

Holotype.—Cat. No. 43521, U.S.N.M.

Hallopora magnopora (Foerste).

Callopora magnopora Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 173; 3, pl. 16, fig. 5; Geol. Surv. Ohio, 7, 1895, p. 600, pl. 29, fig. 5.—Bassler, Bull. U. S. Geol. Surv., 292, 1906, pp. 42, 43, pl. 15, figs. 1-8; pl. 26, fig. 3.

Upper Medinan (Brassfield): Dayton and Centerville, Ohio.

Clinton (Rochester): Grimsby, Ontario.

Plesiotypes.—Cat. Nos. 35532, 44131, U.S.N.M.

Hallopora multitabulata (Ulrich).

Monotrypella multitabulata Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 100.

Hallopora multitabulata—Continued.

Callopora multitabulata Ulrich, Geol. Minnesota, 3, 1893, p. 280, pl. 23, figs. 11, 12, 16, 17, 24–26, 30, 31; Zittel's Textb. Pal. (Engl. ed.), 1896, fig. 456, C, D (p. 274).—Sardeson, Jour. Geol., 9, 1901, p. 9, pl. A, figs. 5–6d.—Ruedemann, Bull. New York State Mus., 49, for 1901, 1902, p. 13.—Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 42, pl. 1, fig. 2.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 22, pl. 1, figs. 5–7.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 139, figs. 188n, 190n.

Hallopora multitabulata Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 326, 327, fig. 202; Zittel-Eastman Textb. Pal., 1913, p. 337, fig. 491.

Monticulipora kentuckensis James, Paleontologist, No. 7, 1883, p. 57, pl. 2, figs. 1, 1b.—James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 180, pl. 2, figs. 6a–d.—J. F. James, *ibid.*, 16, 1894, p. 203.

Black River and Lower Trenton: Burgin, etc., Kentucky; Minneapolis, etc., Minnesota; Tennessee; Ontario; New York; Iowa; etc.

Cotypes.—Cat. Nos. 43522, 43523, U.S.N.M.

Hallopora nodulosa (Nicholson).

Chaetetes? nodulosus Nicholson, Quar. Jour. Geol. Soc. London, 30, 1874, p. 506, pl. 29, figs. 9, 9a.; Pal. Ohio, 2, 1875, p. 200, pl. 21, figs. 10, 10a; Ann. Mag. Nat. Hist., ser. 4, 18, 1876, p. 87, pl. v. 3.

Monticulipora (Heterotrypa) *nodulosa* Nicholson, Genus *Monticulipora*, 1881, p. 116, pl. 1, figs. 4–4d.

Monticulipora nodulosa James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 182.—J. F. James, *ibid.*, 16, 1894, p. 206.

Callopora nodulosa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 252; *ibid.*, 6, 1883, p. 83.—Nickles, Kentucky Geol. Surv. Bull. No. 5, 1905, p. 50, pl. 2, figs. 8, 9.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 786, pl. 9, figs. 2–2c; pl. 27, fig. 8.

Eden (McMicken): Cincinnati, Ohio, and vicinity.

Hallopora onealli (James).

Chaetetes? O'Nealli James, Introd. Catal. Low. Sil. Foss., 1875, p. 2.

Monticulipora o'nealli James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 174.—J. F. James, *ibid.*, 16, 1894, p. 194.

Callopora onealli Miller, N. A. Geol. Pal., 1889, p. 296.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 23, pl. 6, figs. 1, 2.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 786, pl. 9, figs. 3–3b; pl. 27, figs. 9, 10.

Eden: Cincinnati, Ohio, and vicinity (Economy); New York (Indian Ladder).

Hallopora onealli communis (James).

Monticulipora (Heterotrypa) *o'nealli? var. communis* James, Paleontologist, No. 6, 1882, p. 47; *ibid.*, No. 7, 1888, pl. 1, 8.

Monticulipora communis James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 175, pl. 2, figs. 5a, b.—J. F. James, *ibid.*, 16, 1894, p. 195.

Callopora onealli-communis Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 190.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 24, pl. 1, fig. 13; pl. 4, figs. 8, 9.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 788, pl. 8, fig. 10; pl. 27, fig. 11.

Eden (Economy—McMicken): Cincinnati, Ohio, and vicinity.

Plesiotypes.—Cat. No. 35394, U.S.N.M.

Hallopora onealli sigillarioides (Nicholson).

Chaetetes sigillarioides Nicholson, Pal. Ohio, 2, 1875, p. 203, pl. 22, figs. 9, 9a; Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 87, pl. 5, fig. 2.

***Hallopora onealli sigillarioides*—Continued.**

Callopora sigillarioides Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 252; 6, 1883, p. 83.

Callopora sigillarioides Miller, N. A. Geol. Pal., 1889, p. 296, fig. 464.—Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 50, pl. 2, figs. 10, 11.—Bassler, Virginia Geol. Surv., Bull. 2a, 1909, pl. 14, fig. 3.

Callopora onealli-sigillarioides Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 191.—Cumings, Amer. Geol., 28, 1901, p. 374.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, pl. 6, figs. 3, 4.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 789, pl. 9, fig. 4.

Monticulipora (Heterotrypa) O'Nealli (not James) Nicholson, Genus Monticulipora, 1881, p. 118, pl. 3, figs. 3-3f.

Eden (Economy—McMicken): Cincinnati, Ohio, and vicinity.

Pteriotypes.—Cat. No. 35395, U.S.N.M.

***Hallopora pulchella* (Ulrich).**

Callopora pulchella Ulrich, Geol. Minnesota, 3, 1893, p. 283, pl. 22, figs. 1-12.

Black River (Decorah): St. Paul and Cannon Falls, Minnesota.

Cotypes.—Cat. No. 43525, U.S.N.M.

***Hallopora pulchella persimilis* (Ulrich).**

Callopora pulchella var. *persimilis* Ulrich, Geol. Minnesota, 3, 1893, p. 284, pl. 22, figs. 13-17.

Black River (Decorah): Near Cannon Falls, Minnesota.

Cotypes.—Cat. No. 43526, U.S.N.M.

***Hallopora ramosa* (D'Orbigny).**

Monticulipora ramosa D'Orbigny, Prodr. de Pal., 1, 1850, p. 25.—Milne-Edwards and Haime, British Foss. Corals, 1854, p. 265.—Milne-Edwards, Hist. Nat. des Corall., 3, 1860, p. 277.—Nicholson, Tab. Corals Pal. Period, 1879, p. 274, fig. 35b.—Zittel, Handb. Pal., 1, 1880, p. 614, fig. 446b.—James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 181; *ibid.*, 16, 1894, p. 204.—Miller, N. A. Geol. Pal., 1889, p. 197, fig. 198.—Boule and Thevenin, Ann. de Pal., 1, 1906, p. 6, pl. 2, figs. 6-8.

Chaetetes ramosus Milne-Edwards and Haime, Pal. Foss. Terr. Pal., 1851, p. 266, pl. 19, figs. 2, 2a.—Nicholson, Ann. Mag. Nat. Hist., ser. 4, 18, 1876, p. 68.—Quenstedt, Roehren- und Sternkorallen, 1881, p. 77, pl. 146, figs. 13-18.

Monticulipora (Heterotrypa) *ramosa* Nicholson, Pal. Tab. Corals, 1879, p. 296, pl. 13, figs. 2, 2a; Genus Monticulipora, 1881, p. 110, fig. 18, pl. 2, figs. 2, 2a.—Zittel, Handb. Pal., 1, 1880, p. 615, fig. 447; Textb. Pal., English ed., 1896, fig. 185, p. 103, fig. 186B, p. 103.

Heterotrypa ramosa Nicholson in Steinmann, Neues Jahrb. Min., Geol. Pal., 1, 1882, pl. 4, fig. 1.

Callopora ramosa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 252; 6, 1883, p. 83; Geol. Surv. Illinois, 8, 1890, p. 315, fig. 5b.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 139, fig. 194, 1.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 790, pl. 9, figs. 5, 5a; pl. 10, fig. 1; pl. 27, fig. 13, 13a; Bull. Geol. Soc. Amer., 23, 1912, p. 368, pl. 20, fig. 16.

Hallopora ramosa Bassler, Zittel-Eastman Textb. Pal., 1913, p. 337, fig. 490.

Chaetetes Dalei (not of Milne-Edwards and Haime) Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 501, pl. 29, figs. 1, 1a; Pal. Ohio, 2, 1875, p. 192, pl. 21, figs. 1, 1a.—Hall, 12th Ann. Rep. Indiana Geol. Nat. Hist., 1883, p. 249, pl. 11, fig. 2.

Maysville (McMillan): Cincinnati, Ohio, and vicinity.

***Hallopora rugosa* (Milne-Edwards and Haime).**

Chaetetes rugosus Milne-Edwards and Haime, Pal. Foss. Terr. Pal., 1851, p. 268, pl. 20, figs. 6, 6a.—Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 502, pl. 29, fig. 2; Pal. Ohio, 2, 1875, p. 193, pl. 21, fig. 2; Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 87, pl. 5, fig. 4.—Quenstedt, Roehren-und Sternkorallen, 1881, p. 78, pl. 146, figs. 19, 20.

Monticulipora rugosa Milne-Edwards and Haime, British Foss. Corals, 1854, p. 265.—Milne-Edwards, Hist. Nat. des Corall., 3, 1860, p. 277.—Dybowski, Die Chaetetiden d. Ost. Silur-Form., 1877, p. 92, pl. 3, fig. 1.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 172, fig.

Monticulipora (Heterotrypa) ramosa var. *rugosa* Nicholson, Genus Monticulipora, 1881, p. 113, fig. 19A, B, pl. 2, fig. 3.

Monticulipora ramosa var. *rugosa* James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 182.—James, ibid., 16, 1894, p. 205.

Callopora ramosa var. *rugosa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 252.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 793, pl. 10, fig. 2, pl. 27, figs. 14, 14a.

Callopora rugosa Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 192.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 140, fig. 194, 2.

Maysville (McMillan): Cincinnati, Ohio, and vicinity.

***Hallopora subnodosa* (Ulrich).**

Callopora subnodosa Ulrich, Geol. Surv. Illinois, 8, 1890, p. 417, pl. 33, figs. 5, 5c, fig. 3d (p. 308).—Miller, N. A. Geol. Pal., 1889, fig. 465 (p. 296).—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 796, pl. 10, figs. 5, 5a.

Richmond: Blanchester, Waynesville, Hanover, and other localities in Ohio; Richmond and Versailles, Indiana; Wilmington and Savannah, Illinois; Iron Ridge, Wisconsin.

Cotypes.—Cat. No. 43393, U.S.N.M.

***Hallopora subplana* (Ulrich).**

Callopora subplana Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 253, pl. 11, figs. 7, 7b.—J. F. James, ibid., 16, 1894, p. 196.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 795, pl. 10, figs. 4, 4a; pl. 27, fig. 15.

Maysville (Mount Hope and Fairmount): Covington, Kentucky, and vicinity.

Cotypes.—Cat. No. 43649, U.S.N.M.

***Hallopora undulata* (Ulrich).**

Callopora undulata Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 95; Geol. Minnesota, 3, 1893, p. 279, pl. 22, figs. 24–31.

Hallopora undulata Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 332, fig. 208.

Black River (Decorah): Minneapolis and St. Paul, Minnesota.

Ordovician (Wassaleum): Uxnorm, Esthonia, Russia.

Cotypes.—Cat. No. 43816, U.S.N.M.

***HALLOPORINA* Bassler.**

Genotype: *Callopora crenulata* Ulrich.

Calloporina Ulrich and Bassler (not Neviani, 1895), Smiths. Misc. Coll., Quart., 47, 1904, p. 47.

Callopora Ulrich (part), Geol. Minnesota, 3, 1893, p. 275.

Halloporina Bassler, Zittel-Eastman Textb. Pal., 1913, p. 337.

***Halloporina crenulata* (Ulrich).**

Callopora crenulata Ulrich, Geol. Minnesota, 3, 1893, p. 284, pl. 22, figs. 18–23.

Calloporina crenulata Ulrich and Bassler, Smiths. Misc. Coll., Quart., 47, 1904, p. 47, pl. 14, figs. 17–19.

Black River (Decorah) and Trenton (Prosser): St. Paul and Cannon Falls, Minnesota; Decorah, Iowa; Neenah, Wisconsin.

Cotypes.—Cat. No. 43515, U.S.N.M.

Halloporina parva (Ulrich and Bassler).

Calloporina parva Ulrich and Bassler, *Smiths. Misc. Coll., Quart.*, 47, 1904, p. 48, pl. 14, figs. 13-16.

Black River: Near Belfast, Marshall County, Tennessee.

Cotypes.—Cat. No. 43217, U.S.N.M.

HALYSITES Fischer.

Genotype: *H. catenularia* Linnaeus.

Halysites Fischer, *Zoognosia*, 3d ed., 1, 1813, p. 387; Notice sur les Polypiers Tubipores Fossiles, 1828, p. 15.—Fischer de Waldheim, *Oryct. Gouv. Moscou*, 1830, p. 163.—Edwards and Haime, *Compt. Rend. de l'Acad. Sci.*, 29, 1849, p. 261; *Mon. d. Polyp. Foss. d. Terr. Pal.*, 1851 (*Arch. du Mus. d'Hist. Nat.*, 5, 1851), pp. 155, 281.—McCoy, *British Pal. Rocks and Foss.*, 1854, p. 28.—Pictet, *Traite de Pal.*, 2d ed., 4, 1857, p. 445.—Milne-Edwards, *Hist. Nat. d. Corall.*, 3, 1860, p. 286.—Duncan, *Rep. 41st Meeting British Assoc. Adv. Sci.*, 1872, p. 130.—Salter, *Cat. Camb. and Sil. Foss.*, 1873, p. 110.—Rominger, *Geol. Surv. Michigan*, 3, pt. 2, 1876, p. 77.—Lindstrom, *Ann. Mag. Nat. Hist.*, 4th ser., 18, 1876, p. 13.—Nicholson, *Tab. Corals Pal. Period*, 1879, p. 226.—Nicholson and Etheridge, *Mon. Sil. Foss. Girvan Dist.*, 1880, p. 274.—Roemer, *Leth. Geog.*, pt. 1, *Leth. Pal.*, 1883, p. 483.—Miller, *N. A. Geol. Pal.*, 1889, p. 191.—Sardeson, *Neues Jahrb. f. Min., Geol. and Pal.*, Beilage-Band, 10, 1896, p. 272.—Lambe, *Cont. Can. Pal.*, *Geol. Surv. Canada*, 4, pt. 1, 1899, p. 64.—Lindstrom, *Kongl. Sven. Vet.-Akad. Handl.*, 32, No. 1, 1899, p. 25.—Grabau, *Bull. New York State Mus.*, 45, 1901, p. 143; *Bull. Buffalo Soc. Nat. Sci.*, 7, 1901, p. 143.—Pocta, *Syst. Sil. du Centre Boheme*, 8, pt. 2, 1902, p. 268.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1906, p. 96.

Catenipora Lamarck, *Hist. des Amer. sane Vert.*, 2, 1816, p. 206.—Say, *Amer. Jour. Sci. Arts*, 2, 1820, p. 34.—Eichwald, *Zool. Specialis*, pt. 1, Vilnae, p. 192.—Eaton, *Geol. Textb.*, 2d ed., 1832, p. 41.—Steininger, *Mem. Soc. Geol. France*, 1, 1834, p. 342.—Dana, *Wilkes U. S. Expl. Exped.*, 7, *Zoophytes*, 1838, pp. 430, 538.—Goldfuss, *Petrefacts*, 1826, pp. 74, 245; 2d ed., pt. 1, 1862, p. 70.—Say, *Bull. Amer. Pal.*, 1, 1896, p. 282 (reprint).

Halysites agglomeratiformis Whitfield.

Halysites agglomeratiformis Whitfield, *Amer. Mus. Nat. Hist.*, 13, 1900, p. 20, pl. 2, figs. 1, 2.

Niagaran: Cape Harrison, Princess Marie Bay, Arctic America.

Halysites agglomeratus Hall.

Catenipora agglomerata Hall, *Nat. Hist. New York, Geol.*, 4, tab. ill., 22, 1843, fig. 2; *Pal. New York*, 2, 1852, p. 129, pl. 35 (bis), fig. 2a-g.

Halysites agglomerata Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 79 (gen. ref.).—Nicholson and Hinde, *Canadian Jour.*, n. s., 14, 1874, p. 146.—Nicholson, *Geol. Surv. Ohio, Pal.*, 2, 1875, p. 227; *Rep. Pal. Prov. Ontario*, pt. 2, 1875, p. 51, fig. 24; *Tab. Corals Pal. Foss.*, 1879, p. 22, fig. 9.—Lesley, *Geol. Surv. Pennsylvania, Rep. P* 4, 1889, p. 270, figs.—Whiteaves, *Pal. Foss.*, *Geol. Surv. Canada*, 3, pt. 2, 1895, p. 48.—Whitfield, *Bull. Amer. Mus. Nat. Hist.*, 19, 1903, p. 490, pl. 42, figs. 3, 4.—Clarke and Ruedemann, *Mem. New York State Mus.*, 5, 1903, p. 34.

Niagaran: Sweden, Ogden, etc., New York (Lockport-Guelph); Milwaukee, etc., Wisconsin.

HALYSITES AGGLOMERATUS var. **COMPACTUS** Whiteaves. See *Halysites compactus*.**Halysites catenularia** (Linnaeus).

Tubipora catenularia Linnaeus, *Syst. Nat.*, 12th ed., 1767, p. 1270.

Halysites catenularia Edwards and Haime, *Mon. d. Polyp. Foss. d. Terr. Pal.* (*Arch. du Mus. d'Hist. Nat.*, 5), 1851, p. 28.1 (Gives a long list of European

Halysites catenularia—Continued.

references). Mon. British Foss. Corals, Pal. Soc., 1854, p. 270, pl. 64, figs. 1-1c.—Emmons, Man. Geol., 1860, p. 111, fig. 101.—Roemer, Sil. Fauna West. Tennessee, Breslau, 1860, p. 25, pl. 2, fig. 7.—Milne-Edwards, Hist. Nat. Corall., 3, 1860, p. 287.—Hall, Rep. Geol. Surv. Wisconsin, 1862, p. 66, fig. 2.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 85.—Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 146.—Nicholson, Geol. Surv. Ohio, Pal., 2, 1875, p. 227; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 51, figs. 24a, b; Tab. Corals Pal. Period, 1879, p. 22, figs. 9a, b, pl. 10, figs. 7, 7a; pl. 11, figs. 1, 1a.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 486, pl. 9, figs. 6a, 6b.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 47.—Sardeson, Neues Jahrb. f. Min., Geol. and Pal., Beilage-Bd., 10, 1896, p. 272.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 68, pl. 3, figs. 1, 1a, b, 2, 2a, 3, 3a.—Schuchert, Amer. Geol., 31, 1903, p. 164.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 222, pl. 17, figs. 6-8.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 33.—Foerste, Cincinnati Soc. Nat. Hist., Jour. 21, 1909, p. 10.—Lambe, Cruise of the "Neptune," App., 4, 1906, p. 326.

Tubipora catenulatus Linnæus, Syst. Nat., 13th ed., 1789, p. 3753.

Halysites catenulatus Salter, Sutherland's Jour. Voyage in Baffin's Bay, etc., 2, App., 1852, p. 228, pl. 6, fig. 11.—Billings, Canadian Nat. Geol., 1, 1856, p. 319, fig. 9.—Chapman, Canadian Jour., n. s., 6, 1861, p. 509, fig. 76; *ibid.*, 8, 1863, p. 211, fig. 216.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 305, fig. 303.—Chapman, Expos. Min. Geol. Canada, 1864, p. 103, fig. 76; p. 183, fig. 216.—Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 7, 52.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 78, pl. 29, figs. 1, 2, 4.—Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 582.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1878, p. 49.—Emerson, Narrative Hall's 2d Arctic Exped., U. S. Navy Dep., 1879, p. 577.—Whitfield, Geol. Wisconsin, 4, 1882, p. 271, pl. 13, figs. 5-7; p. 241, pl. 10, fig. 6.—White, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 382, pl. 46, figs. 4-7.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 190, fig.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 67, figs. 1-3.—Lesley, Geol. Surv. Pennsylvania, Rep. P. 4, 1889, p. 270, figs.—Miller, N. A. Geol. Pal., 1889, p. 191, fig. 180.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 337.—Grabau, Bull. New York State Mus., 45, 1901, p. 143, fig. 39; Bull. Buffalo Soc. Nat. Sci., 8, 1901, p. 143, fig. 39.—Whitfield, Bull. Amer. Mus. Nat. Hist., 19, 1903, p. 489, pls. 41, 42, fig. 5.—Hayes and Ulrich, U. S. Geol. Surv., Folio 95, ill. sheet, 1903, fig. 6.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 96, fig. 153.—Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 220, pl. 26, fig. 8.

Catenipora escharoides Lamarck, Anim. sans. vertebres, 1st ed., 2, 1816, p. 207.—Say, Amer. Jour. Sci., 2, 1819, p. 34.—Goldfuss, Petrefacta, 1826, p. 74, pl. 25, figs. 4a-c; p. 245.—Eaton, Geol. Textb., 2d ed., 1832, p. 42, pl. 5, fig. 53.—Troost, 5th Geol. Rep. Tennessee, 1840, p. 68.—Castelnau, Essai Syst. Sil. L'Amerique Septent., 1843, p. 45, pl. 17, fig. 3.—Hall, Geol. New York, 4, tab. ill., 22, 1843, fig. 1.—Owen, Geol. Expl. Iowa, Wisconsin, and Illinois, 2d ed., 1844, p. 33, pl. 7, fig. 2.—Hall, Amer. Jour. Sci. Arts, 2d ser., 7, March, p. 228.—Edwards and Haime, Mon. Polyp. Foss. d. Terr. Pal., 1851 (Arch. du Mus. d. Hist. Nat., 5), p. 284; Pal. New York, 2, 1852, p. 44, pl. 18, fig. 2; p. 127, pl. 35, figs. 1a-c; p. 325.—Marcou, Geol. Map. United States and British Prov., etc., 1853, p. 28, pl. 2, fig. 10.—Edwards and Haime, Mon. British Foss. Corals, Pal. Soc., 1854, p. 272, pl. 64, figs. 2, 2a.—Milne-Edwards, Hist.

Halysites catenularia—Continued.

Nat. d. Corall., 3, 1860, p. 289.—Goldfuss, Petrefacta, 2d ed., pt. 1, 1862, p. 70.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 271, fig.—Sardeson, Neues Jahrb. Min., Geol. Pal., Beilage-Band, 10, 1896, p. 273.—Say, Bull. Amer. Pal., 1, 1896, p. 282 (reprint).

Silurian: A widely distributed species in all divisions of the Silurian in Europe and North America.

Halysites catenularia amplitubulatus Lambe.

Halysites catenularia var. *amplitubulata* Lambe, Contr. Canadian Pal., Geol. Surv. Canada, 1899, p. 71, pl. 4, figs. 4, 4a.

Silurian or Helderbergian: L'Anse a la Barbe and L'Anse au Gascon, Quebec.

Halysites catenularia feildeni (Etheridge).

Halysites catenulatus var. *Feildeni* Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 582, pl. 28, fig. 1.

Niagaran: Cape Hilgard, Arctic America.

HALYSITES CATENULARIA var. **GRACILIS** Whiteaves. See *Halysites gracilis*.

Halysites catenularia harti (Etheridge).

Halysites catenulatus var. *Harti* Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 583, pl. 28, fig. 2.

Niagaran: Cape Frazer, Arctic America.

Halysites catenularia microporus (Whitfield).

Halysites catenulatus var. *microporus* Whitfield, Geol. Wisconsin, 4, 1882, p. 272, pl. 13, fig. 6.

Halysites catenularia var. *micropora* Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 70, pl. 3, fig. 4.

Silurian (Racine, Guelph, and Cataract): Bailey's Harbor, etc., Wisconsin; Ontario.

Halysites catenularia nitidus Lambe.

Halysites catenularia var. *nitida* Lambe, Contr. Canadian Pal., Geol. Surv. Canada, 1899, p. 71, pl. 4, figs. 2a, 2b.

Silurian or Helderbergian: L'Anse a la Barbe, Baie des Chaleurs, and Neigette Falls, near Rimouski, Quebec.

Halysites catenularia quebecensis Lambe.

Halysites catenularia var. *quebecensis* Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 69, pl. 4, figs. 1, 1a, b.

Black River or Richmond: Lake St. John, Quebec.

HALYSITES CATENULATUS of authors. See *Halysites catenularia*.

HALYSITES CATENULATUS var. **GRACILIS** Schuchert. See *Halysites gracilis*.

HALYSITES CATENULATUS var. **LABYRINTHICUS** Whitfield. See *Halysites labyrinthicus*.

HALYSITES CATENULATUS **NEXUS** Foerste. See *Halysites labyrinthicus*.

Halysites compactus Rominger.

Halysites compactus Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 79, pl. 29, fig. 3.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 2 (loc. occ.).—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 71, pl. 4, figs. 5, 5a, 6–8a.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 292.

Halysites compactus—Continued.

Halysites agglomeratus var. *compactus* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 48.

Niagaran: Epoufette Point, Michigan; Elora, Galt, and Lake Temiscaming, Ontario; near Donald, British Columbia.

HALYSITES ESCHAROIDES Edwards and Haime. See *Halysites catenularia*.

Halysites gracilis (Hall).

Catenipora gracilis Hall, Geol. Lake Sup. Land Dist., Foster and Whitney's Rep., 1851, p. 212, pl. 29, figs. 1a, b; Rep. Geol. Surv. Wisconsin, 1862, p. 430.

Halysites catenularia var. *gracilis* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 150.—Lambe, Cont. Canadian Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 69, pl. 3, figs. 5, 5a, b, 6, 7.

Halysites catenulatus var. *gracilis* Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 153.

Richmond: Green Bay, Wisconsin; Lake Winnipeg; Anticosti; Ontario; Baffin Land.

Halysites labyrinthicus (Goldfuss).

Catenipora labyrinthica Goldfuss, Petrefacta Germania, 1826, p. 75, pl. 25, figs. 5a, b; see also p. 245.—Troost, 5th Geol. Rep. Tennessee, 1840, p. 68.—Vanuxem, Nat. Hist. New York Geol., 3, 1842, p. 112.—Castelnau, Essai Syst. Sil. l'Amer. Sept., 1843, p. 45, pl. 17, fig. 2.—Goldfuss, Petrefacta, 2d ed., pt. 1, 1862, p. 71.

Halysites catenulatus var. *labyrinthicus* Whitfield, Geol. Wisconsin, 4, 1882, p. 273, pl. 13, fig. 7.

Halysites nexus Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 67, figs. 4, 5.—Foerste, Cincinnati Soc. Nat. Hist., Jour., 21, 1909, p. 10.

Halysites catenulatus nexus Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 338.

Catenipora Michelini Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 45, pl. 17, fig. 1.

Catenipora meandrina Troost, 5th Geol. Rept. Tennessee, 1840, p. 68.

Halysites meandrina Miller, N. A. Geol. Pal., 1889, p. 191 (gen. ref.).

Niagaran: Drummond Island, Lake Huron; Louisville, Kentucky (Louisville); Decatur and Perry Counties, Tennessee (Brownspport); Wisconsin.

HALYSITES NEXUS Davis. See *Halysites labyrinthicus*.

Halysites parryi (König).

Catenipora Parryi König, Supplement to App. of Captain Parry's Voyage for the Discovery of a Northwest Passage, in the years 1819–20, 1824, p. 251.

Halysites parryi Miller, N. A. Geol. Pal., 1889, p. 191 (gen. ref.).

Niagaran: Prince Regents Inlet, Arctic America.

Halysites radiatus Whitfield.

Halysites radiatus Whitfield, Bull. Amer. Mus. Nat. Hist., 19, 1903, p. 490, pl. 42, figs. 1, 2.

Niagaran: Jackson County, Iowa.

Halysites sexto-catenatus Owen.

Halysites sexto-catenatus Owen, Geol. Surv. Indiana, 1862, p. 362.

Niagaran: Huntington County, Indiana.

Observation.—Not recognized. Probably the same as *H. catenularia*.

HAPLOCONUS Raymond.Genotype: *Bathyrus smithi* Billings.

Haploconus Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 61; Zittel, Eastman Textb. Pal., 1913, p. 721.

Haploconus brevimarginatus (Walcott).

Cyphaspis? *brevimarginatus* Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 93, pl. 12, fig. 10.

Haploconus brevimarginatus Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 61 (gen. ref.).

Upper Pogonip: Ridge east of Hamburg Ridge, Eureka District, Nevada.

Holotype.—Cat. No. 24646, U.S.N.M.

Haploconus galenensis (Clarke).

Cyphaspis(?) *galenensis* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 759, fig. 82.

Haploconus galenensis Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 61 (gen. ref.).

Trenton (Prosser): Cannon Falls, Minnesota.

Holotype.—Cat. No. 41956, U.S.N.M.

Haploconus smithi (Billings).

Bathyrus Smithi Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 153, fig. 114a; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 56 (advance sheets, 1862).—

Miller, N. A. Geol. Pal., 1889, p. 534, fig. 973.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 288, fig. 1595.

Haploconus smithi Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 62, pl. 7, figs. 13, 14.

Trenton: Peterborough, Ontario.

HAPLOCRINITES GRANULATUS Troost. See *Haplocrinus granulatus*.

HAPLOCRINITES HEMISPHERICUS Troost. See *Pisocrinus quinquelobus*.

HAPLOCRINITES MAXIMUS Troost. See *Haplocrinus maximus*.

HAPLOCRINITES OVALIS Troost. See *Haplocrinus ovalis*.

HAPLOCRINUS Steininger.Genotype: *H. sphaeroideus* Steininger.

Haplocrinus Steininger, Mem. Geol. Soc. France, 1, 1834, p. 232; Bull. Soc. Geol.

France (Ser.), 8, 1837, p. 231.—Roemer, Rhein. Uebergangs., 1844, p. 63.—

Steininger, Verstein. Eifel, 1849, p. 20.—Quenstedt, Handb. Petref., 1853,

p. 624.—Steininger, Geogn. Beschr. Eifel, 1853, p. 36.—Müller, Verh. Nat.

Verein, Jahrb., 12, 1855, p. 21.—Roemer, Leth. Geog. (Ausg. 3), 1855, p. 260.—

Pictet, Traite de Pal., 2d ed., 4, 1857, p. 309.—Hall, 15th Rep. New York

State Cab. Nat. Hist. for 1861, 1862, p. 143.—Dujardin and Hupe, Hist. Nat.

Des. Zooph. Echin., 1862, p. 105.—Allman, Trans. Royal Soc. Edinburgh, 23,

1864, p. 247, fig. 2.—Schultze, Echin. Eifelk., 1866, p. 103; Denk. d. Kais.

Akad. der Wiss., Math.-Naturw. Cl., 24, Abth. 2, 1866, p. 215, fig. 21.—

DeKoninck, Bull. l'Acad. Roy. Belg., ser. 2, 3 (Extr. 63), 1868.—Zittel,

Handb. Pal., 1, 1879, p. 347.—Quenstedt, Handb. Petref. (Ausg. 3), 1882,

p. 964.—Carpenter, Challenger Rep. Crin., 1885, p. 158, etc.—Wachsmuth and

Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, pp. 79, 83 (Rev. Pal., pt.

3, pp. 155, 159); *ibid.*, 1887, pp. 97–113; *ibid.*, 1888, pp. 339–363.—Miller,

N. A. Geol. Pal., 1889, p. 252.—Wachsmuth and Springer, Proc. Acad. Nat.

Sci. Philadelphia, 1890, pp. 354–390.—Bather, Kongl. Sv. Vet. Akad.

Handl., 25, No. 2, 1893, pp. 20, 25, fig. 5.—Whidborne, Mon. Dev. Fauna

South England, 2, Pal. Soc., 1895, p. 204.—Bather, Treatise on Zool., pt. 3,

Echinoderma, London, 1900, p. 151, figs. 35, 64.—Zittel, Grundzüge Pal., 1,

1910, p. 196.

Aplocrinus D'Orbigny, Prodr. Pal. Strat., 1, 1849, p. 102.

Haplocrinus granulatus (Troost).

Haplocrinites granulatus Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 420; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 61 (nom. nud.).

Haplocrinus granulatus Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 376.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 25, pl. 4, figs. 4, 5.

Niagaran (Brownsport): Decatur County, Tennessee.

Haplocrinus maximus (Troost).

Haplocrinites maximus Troost, Amer. Jour. Sci. Arts., 2d ser., 8, 1849, p. 420; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 61 (nom. nud.).

Haplocrinus maximus Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 376.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 26, pl. 4, figs. 6, 7, 8.

Niagaran (Brownsport): Decatur County, Tennessee.

Haplocrinus ovalis (Troost).

Haplocrinites ovalis Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1849, p. 420; Proc. Amer. Assoc. Adv. Sci., 2, p. 61 (nom. nud.).

Haplocrinus ovalis Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 376; Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 25, pl. 4, fig. 3.

Niagaran (Brownsport): Decatur County, Tennessee.

HARLANIA Goepfert. See *Arthropycus* Hall.**HARLANIA HALLI** Goepfert. See *Arthropycus alleghaniensis*.**Harmodites rugosa** D'Orbigny.

Harmodites rugosa D'Orbigny, Prodr. Pal., 1, 1849, p. 50.—Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, p. 296.—Boule and Thevenin, Ann. de Pal., 1, 1906, p. 7, pl. 9, fig. 5.

Silurian(?): Falls of the Ohio.

Observation.—The figures of Bonle and Thevenin refer to a Devonian species of *Syringopora*.

HARPES Goldfuss.

Genotype: *Trilobites ungula* Sternberg.

Harpes Goldfuss, Nova Acta Physico-Med., 19, 1839, p. 358; Neues Jahrb. f. Min., etc., 1843, pp. 540, 548.—Portlock, Rep. Geol. Londonderry, 1843, p. 265.—Burmeister, Org. der Tril., Berlin, 1843, p. 87.—Emmrich, Neues Jahrb. f. Min., etc., 1845, p. 45.—Beyrich, Untersuchung über Tril., 1846, p. 32.—Hawle and Corda, Abh. böhm. Gesell. d. Wiss., 5 (extract), 1847, p. 162, pl. 7, fig. 83.—Barrande, Neues Jahrb. f. Min., etc., 1850, p. 777; Syst. Sil. du Centre Bohème, 1, 1852, p. 343, pl. 8, 9.—Angelin, Pal. Scandinavica, 3d ed., Holmiae, 1854, p. 86.—Pictet, Traité de Pal., 2d ed., 2, 1854, p. 487.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 1881, p. 65.—Clarke, Jour. Morph., 2, 1888, pp. 265, 266.—Whidborne, Mon. Dev. Fauna South England, 1, Pal. Soc., 1889, p. 29.—Miller, N. A. Geol. Pal., 1889, p. 549.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 756.—Koken, Die Leitfossilien, Leipzig, 1896, p. 15, fig. 9, fig. 3.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, pp. 105, 184, 185, pl. 3, fig. 11.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 34, no. 8, 1901, pp. 27, 31.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 258.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 711.

HARPES (part) of American authors. See *Eoharpes* Raymond.

Harpes telleri Weller.

Harpes telleri Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 213, pl. 20, fig. 2.

Niagaran (Racine): Milwaukee, Wisconsin.

HARPIDES Beyrich.Genotype: *Harpides hospes* Beyrich.

Harpides Beyrich, Unters. Tril., 1846, p. 34.—Hawle and Corda, Abh. d. k. böhmischen Gesell. d. Wiss., 5 (extract), 1847, pp. 161, 166, pl. 7, fig. 84.—Barrande, Neues Jahrb. f. Min., etc., 1850, p. 780.—Pictet, Traité de Pal., 2d ed., 2, 1854, p. 498.—Angelin, Pal. Scandinavica, 3d ed., Holmiae, 1873, p. 86.—Zittel, Handb. Pal., 2, 1885, p. 625.—Miller, N. A. Geol. Pal., 1899, p. 549.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 42, 1894, p. 63.—Koken, Die Leitfossilien, Leipzig, 1896, p. 24.—Frech, Leth. geog., 1 Th., Leth. Pal., 2, 1897, p. 44, footnote.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, p. 185.—Lindstrom, Kongl. Sven. Vet. Akad. Handl., 34, no. 8, 1901, pp. 27, 31, 32.

Dictyocephalites Bergeron, Bull. Soc. Geol. de France, 3d ser., 23, p. 469, pl. 4, figs. 4, 5.—Pompeckj, Ein neuentdecktes Vorkommen von Tremadoc-Fossilien bei Hof, 1896, p. 12; Neues Jahrb. f. Min., 1, 1897, p. 548.—Reed, Geol. Mag., dec. 4, 5, 1898, p. 496.

HARPIDES? AMERICANUS Frech. See *Arethusina americana*.

Harpides atlanticus Billings.

Harpides Atlanticus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 281, fig. 267.

Chazyan (Quebec—P): Four miles northeast Portland Creek, Newfoundland.

Harpides concentricus Billings.

Harpides concentricus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 282, fig. 268.

Chazyan (Quebec—P): Four miles northeast Portland Creek, Newfoundland.

Harpides(?) desertus Billings.

Harpides? desertus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 333, fig. 321.

Canadian (Beekmantown): Bed of Pike River, Bedford, Canada.

HARPINA Novak. See *Eoharpes* Raymond.

HARRISIA Cleland. See *Clelandia* Coesman.

HEBERTELLA Hall and Clarke.Genotype: *Orthis sinuata* Hall.

Group of *Orthis occidentalis* Hall, Bull. Geol. Soc. America, 1, 1889, p. 20.

Hebertella Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 198, 222.—Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 432.—Hall and Clarke, 11th Ann. Rep. New York State Geol., 1894, p. 266.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 254.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 888.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 331.

Eridorthis (subgenus of *Plectorthis*) Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 223.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 381. (Genotype, *Plectorthis* (*Eridorthis*) *nicklesi* Foerste.)

Glyptorthis Foerste, Bull. Sci. Lab. Denison Univ. 17, 1914, p. 257. (Genotype: *Hebertella insculpta* Hall.)

Hebertella alveata Foerste.

Orthis occidentalis Safford (not Hall, 1847), Geol. Tennessee, 1869, p. 275, fig. 11.—Meek, Pal. Ohio, 1, 1873, p. 96, pl. 9, fig. 8.—White, Wheeler's Expl. Survey West 100th Merid., 4, 1875, p. 70, pl. 4, fig. 11.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 94.—Shaler, Mem. Geol. Surv. Kentucky, 1, 1876, pp. 37-39.—White, 2d Ann. Rep. Indiana Bur. Stat. and Geol., 1880, p. 485, pl. 2, figs. 10-12; 10th Rep. State Geol. Indiana, 1881, p. 117, pl. 2, figs. 10-12.—

Hebertella alveata—Continued.

- Whitfield, Geol. Wisconsin, 4, 1882, p. 260, pl. 12, figs. 17, 18.—Hall, 2d Ann. Rep. New York State Geol., 1883, pl. 34, figs. 31-34; pl. 35, figs. 16-21.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 174, fig., p. 155.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 525, figs.—Dennis, Proc. Indiana Acad. Sci. for 1898, 1899, p. 289.
- Hebertella occidentalis** Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 222, pl. 5A, figs. 11, 12.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 255, figs. 304f-h.—Cumings, 32d Ann. Dep. Geol. Nat. Res. Indiana, 1908, p. 906, pl. 34, fig. 4.
- Platystrophia occidentalis** Hall, 36th Rep. New York State Mus. Nat. Hist., 1884, p. 75, pl. 3, fig. 3.
- Hebertella alveata** Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 224, pl. 4, figs. 8a-b.
- Richmond (Liberty, Whitewater): Ohio, Indiana, Kentucky.

Hebertella alveata richmondensis Foerste.

- Hebertella alveata-richmondensis** Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 224, pl. 4, fig. 8c; 1910, 14, p. 55, pl. 5, figs. 10, 17.
- Richmond (Whitewater): Richmond, Indiana.

Hebertella battis (Billings).

- Orthis Battis** Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 185.
- Hebertella battis** Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 222.
- Ozarkian? (Levis—erratic): Point Levis, Quebec.

Hebertella (Glyptorthis) bellarugosa (Conrad).

- Orthis bellarugosa** Conrad, Proc. Acad. Nat. Sci. Philadelphia, 1, 1843, p. 333.—Hall, Pal. New York, 1, 1847, p. 118, pl. 32, fig. 3.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 197, pl. 9, figs. 3a-d.—Shaler, Mem. Geol. Surv. Kentucky, 1, 1876, p. 35.—Lesley, Geol. Surv. Pennsylvania, Rep. P. 4, 1889, p. 507, figs.
- Hebertella bellarugosa** Hall and Clarke, Pal. New York, 7, pt. 1, 1892, p. 222.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 255, figs. 304d-e.—Raymond, Ann. Carnegie Mus., 7, 1911, p. 245, pl. 36, figs. 8, 9, figs. 19, 20.
- Orthis (Hebertella?) bellarugosa** Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 434, pl. 33, figs. 1-4.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 157.
- Glyptorthis bellarugosa** Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 258 (gen. ref.).
- Black River: Mineral Point, Janesville, Neenah, etc., Wisconsin; Minneapolis, St. Paul, Cannon Falls, etc., Minnesota; Decorah and McGregor, Iowa; Curdsville, Kentucky; Baffin Land.
- Chazy (Valcour): Valcour Island, New York.

Hebertella borealis (Billings).

- Orthis borealis** Billings, Canadian Nat. Geol., 4, 1859, p. 436, fig. 14; Geol. Canada, 1863, p. 129, fig. 56; p. 167, fig. 148.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 510, figs.
- Hebertella borealis** Raymond, Ann. Carnegie Mus., 7, 1911, p. 241, figs. 13, 14.
- Chazy: St. Martins Junction, near Montreal, Caughnawaga, etc., Canada (Aylmer); Valcour Island, New York (Valcour); East Tennessee (Lenoir).

HEBERTELLA BOREALIS Hall and Clarke. See **Hebertella frankfortensis**.**Hebertella (Glyptorthis) crispata** (Emmons).

- Orthis crispata** Emmons, Geol. New York, Rep. 2d Dist., 1842, p. 404, fig. 5.—Owen, Amer. Jour. Sci. Arts, 47, 1844, p. 379, fig. 5.—Emmons, Amer. Geology, 1, pt. 2, 1855, pl. 17, fig. 5; Man. Geol., 1860, p. 102, fig. 5.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 512, figs.

Hebertella (Glyptorthis) crispata—Continued.

- Dalmanella crispata Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 224.—
Glyptorthis crispata Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 258.
Cincinnatian (Pulaaki): Lorraine, etc., New York.

Hebertella daytonensis (Foerste).

- Orthis daytonensis Foerste, Bull. Sci. Lab. Denison Univ., 1885, p. 87, pl. 13, figs. 13, 20, 21.
Hebertella daytonensis Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 222.
Orthis (Hebertella) daytonensis Foerste, Geol. Ohio, 7, 1895, p. 575, pl. 25, figs. 13, 20, 21.
Upper Medinan (Brassfield): Dayton, etc., Ohio.

HEBERTELLA EXFOLIATA Raymond. See *Plectorthis exfoliata*.**HEBERTELLA (SCHIZONEMA) FASCIATA** Foerste. See *Orthostrophia (Schizoramma) fasciata*.**Hebertella fausta** (Foerste).

- Orthis fausta Foerste, Bull. Denison Univ., 1, 1885, p. 85, pl. 13, figs. 15, 16.
Hebertella fausta Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 222.
Orthis (Hebertella) fausta and var. squamosa Foerste, Geol. Ohio, 7, 1895, pp. 573, 574, pl. 25, figs. 15a-15d, 16a, 16b; pl. 37A, figs. 19a, 19b.
Upper Medinan: Dayton, Ohio (Brassfield); Ontario (Cataract).

HEBERTELLA (SCHIZONEMA) FISSIPLICA Foerste. See *Orthostrophia (Schizoramma) fissiplica*.**HEBERTELLA (SCHIZONEMA) FISSISTRIATA** Foerste. See *Orthostrophia (Schizoramma) fissistriata*.**Hebertella frankfortensis** Foerste.

- Orthis frankfortensis James, Cat. Lower Sil. Foss. Cincinnati Group, 1871, p. 19 (nom. nud.).
Hebertella frankfortensis Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 318, pl. 7, figs. 11a, b.
Orthis borealis Meek, Pal. Ohio, 1, 1873, p. 101, pl. 8, fig. 4.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 28.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 155, fig.—Leasey (part), Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 518, figs.—Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 36, pl. 34, figs. 14-20.
Orthis (Hebertella) borealis Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 433, fig. 33.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 157.
Hebertella borealis Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 222.—Hayes and Ulrich, U. S. Geol. Surv. Folio 95, ill. sheet, 1903, figs. 36, 37.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 254, fig. 304a-c.—Bassler, Bull. Virginia Geol. Surv., 2a, 1909, p. 183, figs. 11, 12, 20.
Trenton: Frankfort, etc., Kentucky (Wilmore); Columbia, etc., Tennessee: Virginia (Bigby); Wykoff, Minnesota (Prosser); Baffin Land.
Plesiotypes.—Cat. Nos. 48572, 51189, U.S.N.M.

Hebertella imperator (Billings).

- Orthis imperator Billings, Canadian Nat. Geol., 4, 1859, p. 435, figs. 11-13; Geol. Canada, 1863, p. 129, fig. 55.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 518, figs.
Hebertella imperator Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 223.—Raymond, Annals Carnegie Mus., 7, 1911, p. 243, pl. 36, figs. 6, 7.
Chazy (Aylmer): Hawkesbury and Cornwall, Canada.

Hebertella (Glyptorthis) insculpta (Hall).

Orthis insculpta Hall, Pal. New York, 1, 1847, p. 125, pl. 32, fig. 12.—Billings, Geol. Canada, 1863, p. 167, fig. 150.—Meek, Pal. Ohio, 1, 1873, p. 99, pl. 9, fig. 1.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 40.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 195, pl. 9, fig. 12.—Shaler, Mem. Geol. Surv. Kentucky, 1, 1876, p. 30.—Leahey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 520, figs.

Orthis (Hebertella) insculpta Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 435.

Hebertella insculpta Hall and Clarke, Pal., New York, 8, pt. 1, 1892, p. 222, pl. 5A, fig. 13.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 255, fig. 305.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 905, pl. 34, figs. 2-2d.

Glyptorthis insculpta Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 258 (gen. ref.).

Orthis bellarugosa (not Conrad) Hall, 2d Ann. Rep. New York State Geol., 1883, pl. 35, fig. 22.

Richmond: Oxford, etc., Ohio; Indiana; Wilmington, Illinois; Wisconsin; Iowa; Minnesota; Tennessee; etc.

Hebertella latasulcata Foerste.

Hebertella latasulcata Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 131, pl. 3, figs. 7a, b.

Trenton (Upper): Rogers Gap, etc., Kentucky.

Hebertella lonensis (Walcott).

Orthis lonensis Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 74, pl. 11, fig. 6.

Hebertella lonensis Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 222.

Upper Pogonip: Lone Mountain, Nevada.

Holotype.—Cat. No. 17232, U.S.N.M.

Hebertella maria (Billings).

Orthis maria Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 137, fig. 114. (Adv. sheets, 1862.)

Hebertella sinuata or *maria*? Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 222, pl. 5A, figs. 9, 10.

Richmond (English Head) and Gamachian (Ellis Bay): Gamache Bay, etc., Anticosti.

Hebertella maria parkensis Foerste.

Hebertella maria-parkensis Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 319, pl. 7, figs. 6a-b.

Trenton: Between Pleasant Valley and Millersburg, etc. (Cynthiana), and Madison and Woodford Counties, Kentucky (Perryville).

Hebertella (Eridorthis) nicklesi Foerste.

Plectorthis (Eridorthis) nicklesi Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 222, pl. 4, figs. 3a-d.

Eridorthis nicklesi Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 132, pl. 1, figs. 5a-c.

Trenton (Upper): Rogers Gap, Brent, Ivor, etc., Kentucky; Point Pleasant, Ohio.

HEBERTELLA (SCHIZONEMA) NISIS Foerste. See Orthostrophia (Schizoramma) nisis.

Hebertella occidentalis Hall.

Orthis occidentalis Hall, Pal. New York, 1, 1847, p. 127, pl. 32A, fig. 2; pl. 32B, fig. 1; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 72.—Billings, Geol. Canada, 1863, p. 210, fig. 210.

Hebertella occidentalis Foerste, Bull. Sci. Lab. Denison Univ., 14, 1910, p. 53, pl. 2, figs. 1, 2.

Maysville and Richmond: Maysville, etc., Kentucky; Cincinnati, Ohio, and vicinity; Oxford, etc., Ohio; Indiana.

Observation.—See also *H. alveata* Foerste.

Hebertella occidentalis sinuata Hall.

Orthis sinuata Hall, Pal. New York, 1, 1847, p. 128, pl. 32B, fig. 2.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 36.—Shaler, Fossil Brach. Ohio Valley, 1876, pl. 8.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 533, fig. 1.

Orthis occidentalis var. *sinuata* Meek, Pal. Ohio, 1, 1873, p. 98.

Hebertella sinuata Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 222, pl. 11, figs. 1-8.—Hayes and Ulrich, U. S. Geol. Surv., Folio 95, ill. sheet, 1903, fig. 17.—Cumings, Amer. Jour. Sci. (4), 15, 1903, p. 34, footnote.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 256, fig. 306.—Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 52, pl. 2, fig. 5.

Hebertella occidentalis sinuata Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 229.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 908, pl. 34, figs. 3-3e.

Maysville and Richmond: Cincinnati, Ohio, and vicinity; Kentucky; Tennessee; Indiana; etc.

Plesiotype.—Cat. No. 35398, U.S.N.M. (Hayes and Ulrich).

Hebertella (Eridorthis) rogersensis (Foerste).

Plectorthis (Eridorthis) rogersensis Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 223, pl. 14, figs. 4a-b.

Trenton (Upper): Rogers Gap, Kentucky.

Observation.—Probably only a variety of *H. nicklesi*.

HEBERTELLA SCOVILLI Hall and Clarke. See *Plectorthis (Austinella) scovilli*.

HEBERTELLA SINUATA Hall and Clarke. See *Hebertella occidentalis sinuata*.

Hebertella subjugata (Hall).

Orthis subjugata Hall, Pal. New York, 1, 1847, p. 129, pl. 32C, fig. 1.—Owen, U. S. Geol. Surv. Wisconsin, Iowa, Minnesota, 1852, pl. 2B, figs. 4, 5.—Emmons, Amer. Geol., 1, pt. 2, 1855, p. 196.

Hebertella subjugata Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 54, pl. 2, fig. 8; *ibid.*, 17, 1912, p. 129, pl. 8, fig. 6.

Trenton-Richmond: Cincinnati, Ohio, and vicinity; Indiana; Kentucky; Tennessee; Virginia, etc.

Plesiotypes.—Cat. Nos. 17885, 17891, U.S.N.M.

Hebertella vulgaris Raymond.

Orthis perveta Billings (not Conrad), Canadian Nat. Geol., 4, 1859, p. 434.

Orthis subequata Billings (not Billings, 1856), Canadian Nat. Geol., 1859, p. 434.

Orthis gibbosa Billings, Canadian Nat. Geol., 4, 1859, p. 434.

Hebertella vulgaris, Raymond, Ann. Carnegie Mus., 3, 1906, p. 501; *ibid.*, 7, no. 2, 1911, p. 242, pl. 36, figs. 2-5, figs. 15-18, 22.

Chazy: Chazy, Valcour Island, etc., New York (Day Point—Valcour); Canada (Aylmer); East Tennessee (Lenoir).

HELICION ORBICULATUS D'Orbigny. See *Archinacella orbiculatus*.

HELICION PATELLIFORMIS D'Orbigny. See *Archinacella patelliformis*.

HELICIONOPSIS Ulrich and Scofield. Genotype: *H. striata* Ulrich.

Helcionopsis Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, pp. 821, 826.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1909, p. 604.

Helcionopsis striata Ulrich.

Helcionopsis striata Ulrich, *Geol. Minnesota*, 3, pt. 2, 1897, p. 827, pl. 61, figs. 29 and 30. (*H. fasciostata* in error, p. 821).—Grabau and Shimer, *N. A. Index Fossils*, 1, 1909, p. 604, fig. 805a, b.—Foerste, *Jour. Geol.*, 11, 1903, p. 37.

Triblidium striatum Miller, *N. A. Geol. Pal.*, 2d App., 1897, p. 771 (gen. ref.).

Richmond: Marion County, Kentucky.

Maysville: Cincinnati, Ohio.

Holotype.—Cat. No. 45827, U.S.N.M.

Helcionopsis subcarinata Ulrich and Scofield.

Helcionopsis subcarinata Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, p. 827, pl. 61, fig. 28.

Trenton (Prosser): Goodhue County, Minnesota.

Cotypes.—Cat. No. 45828, U.S.N.M.

HELENTEROPHYLLUM Grabau.

Genotype: *H. caliculoides* Grabau.

Helenterophyllum Grabau, *Michigan Geol. Surv.*, *Geol. Ser.*, 1, 1909, p. 95.

Helenterophyllum caliculoides Grabau.

Helenterophyllum caliculoides Grabau, *Michigan Geol. Surv.*, *Geol. Ser.*, 1, 1909, p. 95, pl. 11, figs. 2-3.

Upper Monroan (Anderdon): Anderdon quarry near Amherstburg, Ontario.

Cayugan (Manlius): Manlius, New York.

HELICOGRAPTUS Nicholson. See *Nemagraptus* Emmons.

HELICOPOREA Claypole.

Genotype: *H. latispiralis* Claypole.

Helicopora Claypole, *Proc. Amer. Assoc. Adv. Sci.*, 30, 1881, p. 191; *Quar. Jour. Geol. Soc. London*, 39, 1883, p. 32.—Waagen and Pichl, *Pal. Indica*, ser. 13, 1885, p. 774.—Ulrich, *Contr. Amer. Pal.*, 1, 1886, p. 5.—Miller, *N. A. Geol. Pal.*, 1889, p. 308.—Ulrich, *Geol. Surv. Illinois*, 8, 1890, p. 396.—Simpson, 13th Ann. Rep. State Geol. New York for 1893, 1895, pp. 722, 726; 47th Ann. Rep. New York State Mus., pp. 916, 920.—Ulrich, *Zittel's Textb. Pal. (Engl. ed.)*, 1896, p. 282.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, pp. 517, 522.—Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 39.

Helicopora latispiralis Claypole.

Helicopora latispiralis Claypole, *Proc. Amer. Assoc. Adv. Sci.*, 30, 1881, p. 191; *Quar. Jour. Geol. Soc. London*, 39, 1883, p. 32, pl. 4, figs. 1, 1a.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, fig. 70, 1 (p. 518).

Niagaran: Cedarville, Greene County, Ohio.

HELICOTOMA Salter.

Genotype: *H. planulata* Salter.

Helicotoma Salter, *Canadian Org. Rem.*, *Geol. Surv. Canada*, dec. 1, 1859, p. 13.—Nicholson, *Rep. Pal. Prov. Ontario*, pt. 1, 1874, p. 120.—Miller, *N. A. Geol. Pal.*, 1889, p. 405.—Koken, *Neues Jahrb. f. Min., Pal.*, 1, 1898, p. 24; *Bull. de l'Acad. Imp. Sci. St. Petersburg*, 7, 1897, p. 159.—Ulrich and Scofield, *Geol. Minnesota*, 3, 1897, p. 1032.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1909, p. 658.

***Helicotoma brocki* Foerste.**

Helicotoma brocki Foerste, Bull. Sci. Lab. Denison Univ., 17, 1912, p. 137, pl. 10, fig. 11; pl. 11, fig. 3.

Richmond: Kagawong, Manitoulin Island, Lake Huron.

***Helicotoma declivis* Ulrich.**

Helicotoma declivis Safford, Geol. Tennessee, 1869, p. 288 (nom. nud.).—Ulrich Geol. Minnesota, 3, pt. 2, 1897, p. 1036, pl. 74, figs. 34-38.

Stones River (Murfreesboro): Murfreesboro, Tennessee.

Cotypes.—Cat. No. 46057, U.S.N.M.

***Helicotoma eucharis* Billings.**

Helicotoma Eucharis Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 249, fig. 234a, b.—Miller, N. A. Geol. Pal., 1889, p. 405, fig. 677.

Chazy (Quebec-L, M): Table Head, Newfoundland.

***Helicotoma gorgonea* Billings.**

Helicotoma Gorgonea Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 249, Canadian (Quebec-H): Table Head, Newfoundland.

***Helicotoma granosa* Ulrich.**

Helicotoma granosa Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1035, pl. 82, figs. 32-34.

Black River (Lowville): High Bridge, Kentucky.

Holotype.—Cat. No. 45829, U.S.N.M.

HELICOTOMA LARVATA* Salter. See *Liospira larvata*.**Helicotoma marginata* Ulrich.**

Helicotoma marginata Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1036, pl. 74, fig. 39.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1906, p. 963, pl. 40, fig. 10.

Richmond (Elkhorn): Near Richmond, Indiana.

Holotype.—Cat. No. 45830, U.S.N.M.

***Helicotoma misera* Billings.**

Helicotoma miser Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 309.

Ozarkian? (Levis—erratic): Point Levis, Quebec.

***Helicotoma missouriensis* Branson.**

Helicotoma missouriensis Branson, Trans. Acad. Sci. St. Louis, 18, no. 4, 1909, p. 44, pl. 7, figs. 11-12.

Black River (Auburn-Decorah): Lincoln County, Missouri.

***Helicotoma muricata* (Salter).**

Helicotoma planulata var. *muricata* Salter, Geol. Surv. Canada, dec. 1, 1859, p. 14, pl. 2, fig. 8.

Helicotoma muricata Miller, N. A. Geol. Pal., 1889, p. 405.

Black River (Leray): Allumette Island, Ottawa River, Canada.

***Helicotoma naresii* Etheridge.**

Helicotoma naresii Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 602, pl. 27, fig. 3.

Niagaran: Offley Island, Arctic America.

***Helicotoma(?) peccatonica* Sardeson.**

Helicotoma(?) peccatonica Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 97, pl. 5, figs. 1, 2.

Canadian (Shakopee): Near Argyle, Wisconsin.

***Helicotoma perstriata* Billings.**

Helicotoma perstriata Billings, Canadian Nat. Geol., 4, 1859, p. 356.
Chazyan (Mingan): Mingan Islands, Quebec.

***Helicotoma planulata* Salter.**

Helicotoma planulata Salter, Can. Org. Rem., Geol. Surv. Canada, dec. 1, 1859, p. 14, pl. 2, figs. 5-7.—Hall, Rep. Geol. Surv. Wisconsin, 1862, p. 39, fig. 3; p. 439.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 157.—Whiteaves, Canadian Rec. Sci., 5, 1893, p. 323 (loc. occ.).—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1033, pl. 74, figs. 16-17.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 658, figs. 906h, i.

Black River: Allumette Island, Ottawa River, etc. (Leray), Canada; Lincoln County, Missouri; Wisconsin; New York.

Plesiotypes.—Cat. No. 45831, U.S.N.M.

HELICOTOMA PLANULATA* VAR. *MURICATA* Salter. See *Helicotoma muricata*.**Helicotoma planulata robusta* Ulrich and Scofield.**

Helicotoma planulata var. *robusta* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1033, pl. 74, fig. 15.

Black River (Platteville): Jo Daviess County, Illinois.

Holotype.—Cat. No. 45832, U.S.N.M.

***Helicotoma planulatoides* Ulrich.**

Helicotoma planulatoides Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1034, pl. 74, figs. 23-30.

Black River (Lowville): High Bridge, Kentucky; Tennessee.

Holotype.—Cat. No. 45833, U.S.N.M.

***Helicotoma proserpina* Billings.**

Helicotoma Proserpina Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 247, fig. 233.

Canadian (Quebec—G): Cape Norman, Newfoundland.

***Helicotoma similis* Whitfield.**

Helicotoma similis Whitfield, Bull. Amer. Mus. Nat. Hist., 3, 1890, p. 31, pl. 1, figs. 1, 2.—Sardecson, Jour. Geol., 11, 1903, p. 481, fig. 19.—Seely, Vermont State Geol., Rep. 7, 1910, pl. 56, fig. 2.

Canadian (Beekmantown): Providence Island, Lake Champlain, Vermont.

***Helicotoma? spinosa* Salter.**

Helicotoma? spinosa Salter, Geol. Surv. Canada, dec. 1, 1859, p. 15, pl. 2, figs. 9, 10.

Black River (Leray): Allumette Island, Ottawa River, Canada.

***Helicotoma subquadrata* Ulrich.**

Helicotoma subquadrata Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1034, pl. 70, figs. 31-33.

Stones River (Murfreesboro): Murfreesboro, Tennessee.

Cotypes.—Cat. No. 46058, U.S.N.M.

***Helicotoma tennesseensis* Ulrich and Scofield.**

Helicotoma tennesseensis Safford, Geol. Tennessee, 1869, p. 238 (nom. nud.).—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1034, pl. 74, figs. 20-24.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 659, figs. 906j, k.

Stones River (Murfreesboro): Murfreesboro, Tennessee.

Cotypes.—Cat. No. 46059, U.S.N.M.

***Helicotoma tritonis* Billings.**

Helicotoma Tritonia Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 247.
Canadian (Quebec—G): Cape Norman, Newfoundland.

***Helicotoma umbilicata* Ulrich and Scofield.**

Helicotoma umbilicata Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1034, pl. 62, fig. 68; pl. 74, figs. 25–27.

Black River (Platteville): Minneapolis and St. Paul, Minnesota; Beloit, Mineral Point, etc., Wisconsin; Dixon, etc., Illinois.

Cotypes.—Cat. Nos. 45834, 45835, U.S.N.M.

HELICOTOMA UNIANGULATA* Salter. See *Ophileta uniangulata*.**Helicotoma uniangulata* (Hall).**

Euomphalus uniangulatus Hall, Pal. New York, 1, 1847, p. 9, pl. 13, figs. 1, 1a.

Straparollus uniangulatus Emmons, Amer. Geology, 1, pt. 2, 1855, p. 157.

Helicotoma uniangulata Salter, Geol. Surv. Canada, dec. 1, 1859, p. 13 (gen. rel.).

Ozarkian (Little Falls): Saratoga County, New York.

HELICOTOMA VAGRANS* Raymond. See *Eccyliopterus vagrans*.**Helicotoma verticalis* Ulrich.**

Helicotoma verticalis Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1035, pl. 62, fig. 69; pl. 74, figs. 18, 19.

Black River (Lowville): High Bridge, Kentucky.

Holotype.—Cat. No. 45836, U.S.N.M.

***Helicotoma whiteavesiana* Raymond.**

Helicotoma whiteavesiana Raymond, Ann. Carnegie Mus., 4, 1908, p. 204, pl. 48, figs. 11, 12.

Stones River (Pamelia): Aylmer, Quebec, and Hog Back, near Ottawa, Ontario.

***HELIOLITES* Guettard.**

Genotype: *H. interstinctus* Linnaeus.

Heliolites Guettard, Mem. 3, 1770, p. 454.—Dana, Wilkes' U. S. Expl. Exped., 7, Zoophytes, 1840, pp. 430, 541.—Edwards and Haime, Compt. Rend. l'Acad. Sci., 29, 1849, p. 262; Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1850, pp. 149, 212.—Hall, Pal. New York, 2, 1852, p. 130.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 438.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 234.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 10.—Nicholson, Trans. Royal Soc. Edinburgh, 27, 1876, pp. 247–248.—Lindstrom, Ann. Mag. Nat. Hist., 4th ser., 18, 1876, p. 13.—Zittel, Handb. Pal., 1, 1879, p. 212.—Nicholson, Tab. Corals Pal. Period, 1879, p. 243.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1880, p. 241.—Roemer, Leth. Geog., pt. 1, Leth. Pal., 1883, p. 503.—Koch, Palaeontographica, 29, 1883, pp. 333, 343.—Miller, N. A. Geol. Pal., 1889, p. 191.—James, Jour. Cincinnati Soc. Nat. Hist., 15, pt. 4, 1893, p. 152.—Koken, Die Leitfossilien, Leipzig, 1896, p. 314.—Sardeson, Neues Jahrb. f. Min., Geol. Pal., Beilage-Band, 10, 1896, pp. 252, 263.—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 1, 1909, p. 79.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 32, no. 1, 1909, pp. 35, 38.—Kiaer, Palaeontographica, 46, 1899, p. 39; Zittel-Eastman, Pal., 1, 1900, p. 108.—Grabau, Bull. New York State Mus., 45, 1901, p. 144; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 144.—Pöck, Syst. Sil. du Centre Boheme, 8, pt. 2, 1902, p. 280.—Kiaer, Vid-Selsk. Skrifter, Math.-naturw., 10, 1903, pp. 42, 56.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 97; Zittel-Eastman, Textb. Pal., 2d ed., 1913, p. 112.

***HELIOLITES AFFINIS* Billings. See *Lyellia affinis* (Billings).**

Heliolites elegans Hall.

Heliolites elegans Hall, Pal. New York, 2, 1852, p. 130, pl. 36, figs. 1a-g.—White, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 383, pl. 48, fig. 4.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 273, fig.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 145, fig. 40; Bull. New York State Mus., 45, p. 145, fig. 40.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 98, fig. 157.

Plasmopora elegans Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 15, pl. 3, fig. 2.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 1, figs. 11-13.

Niagaran: Lockport, etc., New York (Lockport); Michigan; Indiana; Kentucky.

HELIOLITES EXIGUUS Billings. See *Lyellia exigua*.**Heliolites inordinatus (Lonsdale).**

Porites inordinata Lonsdale, In Murchison, Sil. Syst., 1839, p. 687, pl. 16 bis, figs. 12a-c.

Heliolites inordinata Milne-Edwards and Haime, Polyp. Foss. des Terr. Paleoz., 1851, p. 217; British Foss. Corals, 1855, p. 253, pl. 57, figs. 7, 7a.—Lambe, Contr. Canadian Pal., Geol. Surv. Canada, 1889, 4, pt. 1, p. 81.

Silurian: England and Ireland.

Helderbergian (?Silurian): West of l'Anse a la Barbe and l'Anse a la Vieille, Baie des Chaleurs, Canada.

Heliolites interstinctus (Linnæus).

Madrepora interstincta Linnæus, Syst. Nat., 12th ed., 1767, p. 1267.

Heliolites interstincta Edwards and Haime, Mon. British Foss. Corals, Pal. Soc., 1854, p. 249, pl. 57, figs. 9-9d; Polyp. Foss. Terr. Pal., 1851, p. 214.—Roemer, Sil. Fauna West. Tennessee, 1860, p. 23, pl. 2, fig. 5, 5a.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 305, fig. 301.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 12, pl. 1, fig. 1.—Hall, 12th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1883, p. 252, pl. 2, figs. 1-3.—Nicholson, Sil. Foss. Girvan Dist., 1880, pp. 57, 254, pl. 16, figs. 1-4.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 506, pl. 9, figs. 3a-3c.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 1, figs. 3, 4.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 273, figs.—Miller, N. A. Geol. Pal., 1889, p. 192, fig. 181.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 47 (loc. occ.).—Lambe, Cont. Can. Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 79, pl. 2, figs. 6, 6a.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 32, No. 1, 1899, p. 41, pl. 1, figs. 1-36; pl. 2, figs. 1, 2; pl. 3, figs. 1, 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 97, fig. 156, 158a, b.

Silurian: Europe. Numerous localities in the Upper Medinan and Niagaran of North America.

Heliolites? macrostylus Hall.

Heliolites macrostylus Hall, Pal. New York, 2, 1852, p. 135, pl. 36A, figs. 2a-c.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1880, p. 252.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 32, No. 1, 1899, p. 67.

Niagaran (Racine): Milwaukee, Wisconsin.

Heliolites megastoma (McCoy).

Porites megastoma McCoy, Sil. Foss. Ireland, 1846, p. 62, pl. 4, fig. 9f.

Palaeopora megastoma McCoy, British Pal. Foss., 1854, p. 16, pl. 1c, fig. 4.

Heliolites megastoma Edwards and Haime, Mon. British Foss. Corals, Pal. Soc., 1854, p. 251, pl. 58, figs. 2-2d.—Rominger, Geol. Surv. Michigan, 3, pt. 2,

Heliolites megastoma—Continued.

1876, p. 11, pl. 1, fig. 3.—Etheridge, Quart. Jour. Geol. Soc. London, 34, 1878, p. 581.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 1, figs. 1, 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 97.

Silurian: Great Britain; New York; Canada; Michigan; Iowa; Wisconsin; Arctic America (Niagaran).

HELIOLITES MICROPORUS Eichwald. See *Heliolites subtubulatus*.

HELIOLITES MURCHISONI Milne-Edwards. See *Heliolites subtubulatus*.

Heliolites perelegans Whitfield.

Heliolites perelegans Whitfield, Amer. Mus. Nat. Hist., 13, 1900, p. 21, pl. 1, fig. 2
Niagaran: Cape Harrison, Princess Marie Bay, Greenland.

Heliolites pyriformis Guettard.

Heliolites pyriformis Guettard, Mem. 3, 1870, p. 454.—Hall, Pal. New York, 2, 1852, p. 133, pl. 36A, fig. 1a-m.—Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 11, pl. 1, fig. 2.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1880, p. 246.—Davis, Kentucky Fossil Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 1, figs. 5, 6.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 32, No. 1, 1899, p. 67.—Grabau, Bull. New York State Mus., 45, 1901, p. 146, fig. 42.

Niagaran: Lockport, etc., New York (Lockport); Drummonds Island, Lake Huron; Iowa; Wisconsin; Kentucky.

Heliolites shepardi James.

Not recognized.

Heliolites shepardi James, Paleontologist, No. 1, 1878, p. 2; Jour. Cincinnati Soc. Nat. Hist., 15, pt. 4, 1893, p. 152.

Richmond?: Brush Creek, Adams County, Ohio.

HELIOLITES SPARSUS Billings. See *Plasmopora petaliformis*.

HELIOLITES SPECIOSUS Billings. See *Lyellia speciosus*.

Heliolites spiniporus Hall.

Heliolites spinipora Hall, Pal. New York, 2, 1852, p. 131, pl. 36, fig. 2a-n—Chamberlin, Geol. Wisconsin, 1, 1883, p. 190, fig.—Grabau, Bull. New York State Mus., 45, 1901, p. 145, fig. 41; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 145, fig. 41.

Niagaran: Lockport, New York (Lockport); Wisconsin (Racine).

Heliolites spongiosus Foerste.

Heliolites spongiosa Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 303, pl. 3, fig. 3; pl. 4, fig. 6; and pl. 5, fig. 5.

Clinton (Waco): Near Irvine, Kentucky.

Heliolites subtubulatus (McCoy).

Palaopora interstincta var. *subtubulata* McCoy, British Pal. Foss., 1851, p. 14, pl. 1, 1c, figs. 2a-b.

Heliolites subtubulatus Rominger, Geol. Surv. Michigan, 3, pt. 2, 1876, p. 13, pl. 1, fig. 4.—Davis, Kentucky Foss. Corals, Geol. Surv. Kentucky, pt. 2, 1885, pl. 1, figs. 7, 8.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 332; Geol. Surv. Ohio, Pal. 7, 1893, p. 601.—Lambe, Contr. Can. Pal., Geol. Surv. Canada, 4, pt. 1, 1899, p. 80, pl. 2, figs. 7, 7a.—Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 304, pl. 3, figs. 5a, b.

Heliolites subtubulatus—Continued.

Heliolites Murchisoni Milne-Edwards and Haime, British Foss. Corals, 1855, p. 250, pl. 57, figs. 6a-c; Polyp. Foss. des Palaeoz., 1851, p. 215.

Heliolites microporus Eichwald, Leth. Rossica, 1860, p. 454, pl. 25, figs. 7a-c.

Silurian: Europe, Canada, Michigan, Iowa, Kentucky, Tennessee, Ohio, etc. (Niagaran).

Heliolites subtubulatus distans Foerste.

Heliolites subtubulata-distans Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 3-5, pl. 3, fig. 5B.

Clinton (Waco): Near Waco and near Irvine, Kentucky.

Heliolites subtubulatus nucella Foerste.

Heliolites subtubulata-nucella Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 305, pl. 3, fig. 5A.

Clinton (Waco): North of Estill Springs, Kentucky.

HELIOLITES TENUIS Billings. See *Protarea tenuis*.**HELIOLITES VETUSTA** Hall. See *Protarea vetusta*.**HELIOMERA** Raymond.

Genotype: *Cheirurus sol* Billings.

Heliomera Raymond, Amer. Jour. Sci., 20, 1905, p. 381.

Heliomera sol (Billings).

Cheirurus sol Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 288, fig. 276.

Heliomera sol Raymond, Amer. Jour. Sci., 20, 1905, p. 381; Ann. Carnegie Mus., 7, no. 1, 1910, p. 77, pl. 18, fig. 12, fig. 9; 7th Rep., Vermont State Geol., 1910, p. 245, pl. 38, fig. 12.—Perkins, Rep. Vermont State Geol., 8th ser., 1912, pl. 18, fig. 12.

Chazy: Table Head and four miles northeast Portland Creek, Newfoundland (Quebec-N., P.); Chazy, New York (Day Point).

HELIOPHRENTIS Grabau.

Genotype: *H. alternata* Grabau.

Heliophrentis Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 98.

Heliophrentis alternata Grabau.

Heliophrentis alternatum Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 99, pl. 12, figs. 2, 3.

Upper Monroan (Amherstburg): Detroit River, near Amherstburg, Ontario.

Heliophrentis alternata compressa Grabau.

Heliophrentis alternatum mutation compressa Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 100, pl. 13, figs. 4, 5.

Upper Monroan (Amherstburg): Detroit River bed, opposite Amherstburg, Ontario.

Heliophrentis alternata magna Grabau.

Heliophrentis alternatum mut. magna Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 101, pl. 13, fig. 6.

Upper Monroan (Amherstburg): Detroit River bed, opposite Amherstburg, Ontario.

Heliophrentis carinata Grabau.

Heliophrentis carinatum Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 101, pl. 12, fig. 2; pl. 13, fig. 7.

Upper Monroan: Near Amherstburg, Ontario, and Wayne County, Michigan (Amherstburg); Monroe County, Michigan (?Lucas).

- HELIOPHYCUS** Miller and Dyer. Genotype: *H. stelliforme* Miller and Dyer.
Heliophycus Miller and Dyer, Cont. to Pal., no. 2, 1878, p. 2.—James, Jour. Cincinnati Soc. Nat. Hist., 7, 1885, p. 163.—Miller, N. A. Geol. Pal., 1889, p. 119.
- Heliophycus stelliforme*** Miller and Dyer.
Heliophycus stelliforme Miller and Dyer, Contr. to Pal., no. 2, 1878, p. 2, pl. 3, fig. 3.—Miller, N. A. Geol. Pal., 1889, p. 120, fig. 39.
 Maysville (Fairmount): Cincinnati, Ohio.
- HELIOPHYLLUM** Dana. Genotype: *H. halli* Edwards and Haime.
Heliophyllum Dana, Wilkes' U. S. Expl. Exped. 1838-42, 7, Zoophytes, 1846, p. 356, pl. 26, figs. 3, 4; Amer. Jour. Sci. and Arts, 2d ser., 1, 1846, p. 153.—Edwards and Haime, Mon. d. Polyp. Foss. d. Terr. Pal. (Arch. du Mus. d'Hist. Nat., 5), 1851, p. 170; p. 408.—Pictet, Traité de Pal., 2d ed., 4, 1867, p. 457.—Billings, Canadian Jour., n. s., 4, 1859, p. 124.—Milne-Edwards, Hist. Nat. d. Corall., 3, 1860, p. 401.—Ludwig, Palaeontographica, 10, 1862, p. 183; p. 192.—Dybowaki, Archiv. f. Naturf. Liv-, Ebst- und Kurl., 3, 1873, p. 339.—Nicholson, Canadian Nat., n. s., 7, 1874, p. 141; Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 24; Geol. Mag., dec. 2, 1, 1874, p. 58.—Nicholson and Thomson, Proc. Roy. Soc. Edinburgh, 9, 1876, p. 149.—Nicholson, Ann. Mag. Nat. Hist., ser. 5, 1, 1878, p. 44.—Zittel, Handb. Pal., 1, 1879, p. 231.—Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 342.—Frech, Pal. Abhandl. Dames and Kayser, 3, Heft 3, 1886, p. 53.—Miller, N. A. Geol. Pal., 1889, p. 192.—Sherzer, Amer. Geol., 6, 1890, p. 60; 7, 1891, pp. 200-295.—Koken, Die Leitfossilien, Leipzig, 1896, p. 310.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 124.
- Heliophyllum dentilineatum*** Hall.
Heliophyllum dentilineatum Hall, 35th Rep. New York State Mus. Nat. Hist. (ext. 1882, p. 13), 1884, p. 417.
 Niagaran (?Louisville): Louisville, Kentucky.
- Heliophyllum flos*** Greene.
Heliophyllum flos Greene, Cont. Indiana Pal., pt. 3, 1899, p. 18, pl. 7, figs. 6-8.
 Niagaran (Louisville): Louisville, Kentucky.
- Heliophyllum gemmiferum*** Hall.
Heliophyllum gemmiferum Hall, 35th Rep. New York State Mus. Nat. Hist. (ext. 1882, p. 13), 1884, p. 417.
 Niagaran (?Louisville): Near Louisville, Kentucky.
- Heliophyllum mitellum*** Hall.
Heliophyllum mitellum Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 418. (Ext. 1882).
 Niagaran (?Louisville): Louisville, Kentucky.
- Heliophyllum pegramense*** Foerste.
Heliophyllum pegramensis Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 100, pl. 3, fig. 58a, b.
 Niagaran (Brownsport): Pegram, Tennessee.
- Heliophyllum pravum*** Hall.
Heliophyllum pravum Hall, 12th Ann. Rep. Indiana, Dep. Geol. Nat. Hist., 1883, p. 274, pl. 15, fig. 12; pl. 25, fig. 4; 35th Rep. New York State Mus. Nat. Hist. (ext. 1882, p. 13) p. 417.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 280, figs.
 Niagaran (Louisville): Louisville, Kentucky.

Hellophyllum puteatum Hall.

Hellophyllum puteatum Hall, 35th Rep. New York State Mus. Nat. Hist. (ext. 1882, p. 14), 1884, p. 418.

Niagaran (?Louisville): Louisville, Kentucky.

HELLIPORA (CONSTELLARIA) ANTHELOIDEA Rominger. See *Constellaria florida*.

HELMINTHOLITUS Linnæus. See *Conchidium Linnæus*.

HELOCERAS Barrande. See *Cycloceras McCoy*.

HELOPORA Hall.

Genotype: *H. fragilis* Hall.

Helopora Hall, Amer. Jour. Sci., 2d ser., 11, 1851, pp. 388, 389; Pal. New York, 2, 1852, p. 44.—Billings, Cat. Sil. Foss. Anticosti, p. 36.—Ulrich, Amer. Geol., 1, 1888, p. 231.—Miller, N. A. Geol. Pal., 1889, p. 308.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 401, 642; Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 191; Geol. Minnesota, 3, 1893, p. 183.—Pocta, Syst. Sil. Centre Boheme., 8, pt. 1, 1894, p. 8.—Zittel's Textb. Pal. (Engl. ed.), 1896, p. 280.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 548.—Nickles and Bassler, Bull. U. S. Geol. Surv., no. 173, 1900, p. 42.—Graßau, Bull. New York State Mus., 45, 1901, p. 172; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 172.—Hennig, Archiv. fur Zool., K. Sven. Vet.-Akad. Stockholm, 3, 1906, p. 18.—Grabau and Shimer, N. A. Index Fossils, 1, p. 152.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 747.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 149; Zittel-Eastman Textb. Pal., 1913, p. 342.

Helopora alternata Ulrich.

Helopora alternata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 192, fig. 16f; Geol. Minnesota, 3, 1893, p. 192, pl. 3, fig. 9.

Black River (Decorah): Minneapolis, Minnesota.

Holotype.—Cat. No. 43566, U.S.N.M.

Helopora approximata James. Not recognized.

Helopora approximata James, Paleontologist, no. 1, 1875, p. 3.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 39.

Eden: Cincinnati, Ohio.

Observation.—Founded on some *Bythopora* (probably *B. arctipora*) with a bulbous extremity due to irregular growth.

Helopora armata Billings.

Helopora armata Billings, Cat. Sil. Foss. Anticosti, 1866, p. 38.

Anticostian (Jupiter River): East Point, Anticosti.

Helopora bellula Billings.

Helopora bellula Billings, Catal. Sil. Foss. Anticosti, 1866, p. 38.

Anticostian (Gun River and Jupiter River): East Point, etc., Anticosti.

HELOPORA CIRCE Billings. See *Chilotrypa circe*.

Helopora concava Billings.

Helopora concava Billings, Catal. Sil. Foss. Anticosti, 1866, p. 37.

Anticostian (Bessie River—Jupiter River): East Jupiter River, East Point, etc., Anticosti.

HELOPORA DENDRINA James. See *Bythopora dendrina*.

Helopora divaricata Ulrich.

Helopora divaricata Ulrich, 14th Ann. Rep. Geol. Minnesota, 1886, p. 59; Geol. Minnesota, 3, 1893, p. 191, pl. 3, figs. 1-3.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 149, 150, fig. 72.

***Helopora divaricata*—Continued.**

Black River (Decorah): Minneapolis, etc., Minnesota.

Middle Ordovician (Kuckers): Esthonia, Russia.

Cotypes.—Cat. No. 43568, U.S.N.M.

***Helopora elegans* Ulrich.**

Helopora elegans Ulrich, Geol. Minnesota, 3, 1893, p. 194, fig. 11.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 837, pl. 29, fig. 9.

Richmond (Whitewater): Blanchester, Oxford, etc., Ohio; Richmond and Versailles, Indiana.

Holotype.—Cat. No. 43566, U.S.N.M.

***Helopora formosa* Billings.**

Helopora formosa Billings, Catal. Sil. Foss. Anticosti, 1866, p. 37.

Helopora nodosa Billings, Catal. Sil. Foss. Anticosti, 1866, p. 38.

Nematopora formosa Ulrich, Geol. Surv. Illinois, 8, 1890, p. 645.

Gamachian (Ellis Bay) and Anticostian (Becksie River—Jupiter River): East Point, East Jupiter River, East River, etc., Anticosti.

***Helopora fragilis* Hall.**

Helopora fragilis Hall, Pal. New York, 2, 1852, p. 44, pl. 18, figs. 3a-f.—Nicholson and Hinde, Canadian Jour., n. s., 14, 1874, p. 141.—Nicholson, Pal. Province Ontario, 1875, p. 44, fig. 19, figs. 3, 3a.—Ulrich, American Geol., 1, 1888, p. 233, fig. 2a-e.—Miller, N. A. Geol. Pal., figs. 485a-e, 486 (p. 308).—Ulrich, Geol. Surv. Illinois, 8, p. 642, figs. 18a-e (p. 643), pl. 29, fig. 5a.—Grabau, Bull. New York State Mus., 45, 1901, p. 173, fig. 74; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 173, fig. 74.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 152, fig. 207.

Upper Medinan (Cataract): Western New York; Flamorough Head, etc., Ontario.

Lower Clinton: Wayne County, etc., New York.

Plesiotype.—Cat. No. 43369, U.S.N.M.

***Helopora fragilis acadensis* Hall.**

Not defined.

Helopora fragilis var. *acadensis* Hall, Canadian Nat. Geol., 5, 1860, p. 159.

Silurian: Nova Scotia.

***Helopora harrisi* James.**

Helopora harrisi James, Paleontologist, No. 7, 1883, p. 58, pl. 2, figs. 2-2b.—Ulrich, Contr. Micro-Pal. Cambro-Sil., pt. 2, 1889, p. 45; Geol. Minnesota, 3, 1893, p. 195, pl. 3, figs. 11b, c, 12.—Whiteaves, Pal. Foss., 3, pt. 2, 1895, p. 117.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, figs. 113-115 (p. 548).—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 40, pl. 7, fig. 8.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 837, pl. 29, figs. 10-10b.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 343, fig. 501f.

Richmond: Waynesville, etc., Ohio; Indiana (Waynesville, Liberty); ?Stony Mountain, Manitoba.

Plesiotypes.—Cat. No. 43569, U.S.N.M.

***Helopora imbricata* Ulrich.**

Helopora imbricata Ulrich, Geol. Surv. Illinois, 8, 1890, p. 644, pl. 29, fig. 5.

Richmond: Wilmington, Illinois (Fernvale); Charleton Point, etc., Anticosti (Charleton).

Observation.—This form may be the tertiary segments of *Arthroclema angulare* Ulrich.

HELOPORA IRREGULARIS Billings. See *Trematopora irregularis*.

HELOPORA LINEATA Billings. See *Nematopora lineata*.

Helopora lineopora Billings.

Helopora lineopora Billings, Catal. Sil. Foss. Anticosti, 1866, p. 38.

Nematopora? *lineopora* Ulrich, Geol. Surv. Illinois, 8, 1890, p. 645.

Gamachian (Ellis Bay) and Anticostian (Gun River): East of Jupiter River, etc., Anticosti.

HELOPORA MEEKI James. See *Dicranopora meeki*.

Helopora mucronata Ulrich.

Helopora mucronata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 12, 1890, p. 192, figs., fig. 16e; Geol. Minnesota, 3, 1893, p. 193, pl. 3, 10.

Trenton (Prosser): Cannon Falls and St. Paul, Minnesota.

Cotypes.—Cat. No. 43677, U.S.N.M.

HELOPORA NODOSA Billings. See *Helopora formosa*.

HELOPORA PARVULA James. See *Bythopora parvula*.

Helopora quadrata Ulrich.

Helopora quadrata Ulrich, Geol. Minnesota, 3, 1893, p. 193, fig. 10.

Trenton (Prosser): Cannon Falls, Minnesota.

Cotypes.—Cat. No. 43567, U.S.N.M.

Helopora spiniformis (Ulrich).

Arthroclima spiniformis Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 161, pl. 6, figs. 10, 10a.

Helopora spiniformis Ulrich, Geol. Minnesota, 3, 1893, pl. 3, figs. 4, 5, 6; Zittel's Textb. Pal. (Engl. ed.), 1896, fig. 469 (p. 283).—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 152, fig. 205j.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 343, fig. 502.

Stones River (Lebanon): Lebanon, Laverne, etc., Tennessee.

Cotypes.—Cat. No. 43665, U.S.N.M.

HELOPORA STRIATOPORA Billings. See *Thamniscus striatopora*.

HELOPORA STRIGOSA Billings. See *Glauconome strigosa*.

HELOPORA TENUIS James. See *Arthrostylus tenuis*.

HELOPORA VARIPORA Billings. See *Lioclema variporum*.

HEMICOSMITES Hall. See *Coelocystis* Schuchert.

HEMICRYPTURUS Green. See *Asaphus Brongniart*.

HEMICRYPTURUS CLINTONI Van Ingen. See *Calymene clintoni*.

HEMICYSTIS Haeckel. See *Hemicystites* Hall.

HEMICYSTITES Hall.

Genotype: *H. parasiticus* Hall.

Hemicystites Hall, Pal. New York, 2, 1852, pp. 245, 355.—Chapman, Canadian Jour., n. s., 2, 1857, p. 304.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 305.—Hall, Pal. New York, 3, 1859, p. 152; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 81.—Zittel, Handb. Pal., 1, 1879, p. 414.—Miller, N. A. Geol. Pal., 1889, p. 252.—Jaekel, Stammes. Pelmat., 1, 1899, p. 49.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 207.—Zittel, Grundzuge Pal., 1, 1910, p. 182.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 473.

Hemicystis Haeckel, Amphorideen u. Cystoideen, Leipzig, 1896, p. 111.

HEMICYSTITES—Continued.

Cystaster Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, footnote, pl. 6 (adv. sheets 1871).—Jaekel, *Stammes. Pelmat.*, 1, *Thecoidea u. Cystoidea*, Berlin, 1899, p. 43.—Bather, *Treatise on Zool.*, pt. 3, *Echinoderma*, London, 1900, p. 207, fig. 2. (Genotype: *Hemicystites granulatus* Hall.)

Thecocyrtis Jaekel, *Stammes. Pelmat.*, 1, *Thecoidea u. Cystoidea*, Berlin, 1899, p. 43. (Genotype: *T. sacculus* Jaekel.)

Hemicystites billingsi (Chapman).

Agelacrinus billingsi Chapman, *Canadian Jour.*, 5, 1860, pp. 358, 204.

Hemicystites (*Agelacrinites*) *Billingsii* Sladen, *Quart. Jour. Geol. Soc.*, 35, 1879, p. 750.

Agelacrinites Billingsi Chapman, *Ann. Mag. Nat. Hist.*, 3d ser., 6, 1860, p. 157, fig.—Billings, *Canadian Jour.*, n. s., 6, 1861, p. 516, fig. 86.—Chapman, *ibid.*, n. s., 8, 1863, p. 199, fig. 180; *Expos. Min. Geol. Canada*, 1864, p. 110, fig. 86; p. 171, fig. 180.

Hemicystites Billingsi Jaekel, *Stammes. Pelmat.*, 1, *Thecoidea u. Cystoidea*, Berlin, 1899, p. 49 (gen. ref.).

Trenton (?Curdsville): Peterboro, Ontario.

Hemicystites carnensis Foerste.

Hemicystites carnensis Foerste, *Bull. Sci. Lab. Denison Univ.*, 17, 1914, p. 455, pl. 3, fig. 2.

Trenton (Upper): Carntown, Kentucky.

Hemicystites (Cystaster) granulatus Hall.

Hemicystites (Cystaster) granulatus Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, pl. 6, figs. 1–4 (adv. sheets 1871).—Meek, *Geol. Surv. Ohio, Pal.*, 1, 1873, p. 54, pl. 3, figs. 9a, b.

Hemicystites granulatus Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 473, fig. 1784c.

Hemicystis granulata Haeckel, *Amphorideen u. Cystoideen*, Leipzig, 1896, p. 112, pl. 3, figs. 27, 28.

Thecocyrtis sacculus Jaekel, *Stammesges. Pelmat.*, 1, 1899, p. 43, pl. 1, figs. 1a, b. *Cystaster granulatus* Jaekel, *ibid.*, p. 44, pl. 1, fig. 2.—Bather, *Treatise on Zool.*, pt. 3, *Echinoderma*, London, 1900, p. 206, fig. 2.—Foerste, *Bull. Sci. Lab. Denison Univ.*, 17, 1914, pl. 6, fig. 5.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

Hemicystites parasiticus Hall.

Hemicystites parasitica Hall, *Pal. New York*, 2, 1852, p. 246, pl. 51, figs. 18–20.—Pictet, *Traite de Pal.*, 2d ed., 4, 1857, p. 305, pl. 99, fig. 25.—Meek and Worthen, *Proc. Acad. Nat. Sci. Philadelphia*, 1868, footnote, p. 357.—Jaekel, *Stammes. Pelmat.*, 1, *Thecoidea u. Cystoidea*, 1899, Berlin, p. 49.

Agelacrinus parasitica Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 81 (gen. ref.).

Clinton (Rochester): Lockport, New York.

Hemicystites stellatus Hall.

Hemicystites stellatus Hall, 24th Rep. New York State Cab. Nat. Hist., 1871, pl. 2, fig. 5, 6.—Meek, *Geol. Surv. Ohio, Pal.*, 1, 1873, p. 52, pl. 3, figs. 8a, b.—Miller, *N. A. Geol. Pal.*, 1889, p. 252, fig. 328.—Jaekel, *Stammes. Pelmat.*, 1, *Thecoidea u. Cystoidea*, Berlin, 1899, p. 49.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 473, fig. 1784a.—Foerste, *Bull. Sci. Lab. Denison Univ.*, 17, 1914, pl. 6, fig. 6.

Hemicystites stellatus—Continued.

Agelacrinus (*Hemicystites*) *stellatus* Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 215, pl. 6, figs. 5, 6 (adv. sheets, 1866).

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

HEMIGYRASPIDIS Raymond.

Genotype: *Asaphus affinis* McCoy.

Hemigyraspis Raymond, Ann. Carnegie Mus., 7, no. 1, 1910, p. 41; Trans. and Proc. Roy. Soc. Canada, 5, 3d ser., sec. 4, 1912, p. 117; Zittel-Eastman Textb. Pal., 1913, p. 719.

Hemigyraspis collieana Raymond.

Asaphus marginalis Collie (not Hall), Bull. Geol. Soc. Amer., 14, 1903, p. 413.

Hemigyraspis collieana Raymond, Ann. Carnegie Mus., 7, 1910, p. 41, pl. 14, figs. 9–13.

Canadian (Beekmantown): Bellefonte, Pennsylvania.

Hemigyraspis liquensis (Hoek).

Ogygia liquensis Hoek, Neues Jahrb. Min., Geol. Pal., 34, 1912, p. 230, pl. 14. Lowest Ordovician: Near Camargo, Bolivia.

Hemigyraspis mcconnelli Raymond.

Hemigyraspis mcconnelli Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 40, pl. 4, fig. 4.

Hemigyraspis sp. Raymond, Trans. Roy. Soc. Canada, 5, 1912, pl. 3, fig. 7.

Lower Ordovician (Ceratopyge beds): Three miles east of Golden, British Columbia.

Hemigyraspis plana (Matthew).

Asaphellus(?) *planus* Matthew, Bull. Nat. Hist. Soc. New Brunswick, no. 20, 1902, p. 419, pl. 18, fig. 11; Geol. Surv. Canada, Rep. Cambrian Rocks Cape Breton, 1903, p. 237, pl. 18, fig. 11.

Canadian (Bretonian. Div. C 3c2): McLeod Brook, Boisdale, Cape Breton, Nova Scotia.

HEMIPHRAAGMA Ulrich.

Genotype: *Batostoma irrasum* Ulrich.

Batostoma (in part) Ulrich, Geol. Surv. Illinois, 8, 1890, p. 379.

Hemiphragma Ulrich, Geol. Minnesota, 3, 1893, p. 299; Zittel's Textb. Pal. (Engl. ed.), 1896, p. 275.—Simpson, 14th Ann. Rep. State Geol. New York, 1894, 1897, p. 592.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 35.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 281, 282; Zittel-Eastman Textb. Pal., 1913, p. 338.

Hemiphragma imperfectum (Ulrich).

Batostoma imperfectum Ulrich, Geol. Surv. Illinois, 8, 1890, p. 460, pl. 25, figs. 3–3d

Hemiphragma imperfectum Ulrich, Geol. Minnesota, 3, 1893, p. 301.

Monticulipora imperfectum J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 196.

Richmond (Fernvale): Wilmington, Illinois; Tennessee; Texas.

Sections of *cotypes*.—Cat. No. 44061, U.S.N.M.

Hemiphragma irrasum (Ulrich).

Batostoma irrasa Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 94.

Hemiphragma irrasum Ulrich, Geol. Minnesota, 3, 1893, p. 299, pl. 24, figs. 5–19; Zittel's Textb. Pal. (Engl. ed.), 1896, fig. 460 (p. 275).—Simpson, 14th Ann. Rep. State Geol. New York for the year 1894, 1897, figs. 190–193 (p. 592).—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 284–286, figs. 172, 173; Zittel-Eastman Textb. Pal., 1913, p. 338, fig. 493.

Hemiphragma irrasum—Continued.

Black River (Decorah) and Trenton (Prosser): Minneapolis, etc., Minnesota; Decorah, Iowa; Wisconsin; etc.

Middle Ordovician (Orthoceras limestone): Baltischport, Russia.

Cotypes and pleiotype.—Cat. Nos. 43564, 57417, U.S.N.M.

Hemiphragma ottawaense (Foord).

Batostoma Ottawaense Foord, Contr. Micro-Pal. Cambro-Sil., 1883, p. 18, pl. 2, figs. 1-1f.

Hemiphragma ottawaense Ulrich, Geol. Minnesota, 3, 1893, p. 300, pl. 24, figs. 1-4.

Batostoma (Hemiphragma) ottawaense Sardeson, Jour. Geol., 9, 1901, p. 13.

Black River and Trenton: Ottawa and Paquettes Rapids, Ottawa River, Canada; Kenyon, Berne, and Mantorville, Minnesota.

Hemiphragma tenuimurale Ulrich.

Hemiphragma tenuimurale Ulrich, Geol. Minnesota, 3, 1893, p. 301, pl. 24, figs. 21-23.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 282, 283, figs. 170, 171.

Batostoma (Hemiphragma) tenuimurale Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 137, fig. 1901.

Trenton (Prosser): Goodhue County, Minnesota; Iowa.

Middle Ordovician (Wassaleim): Uxnorm, near Reval, Esthonia, Russia.

Cotypes and pleiotype.—Cat. Nos. 43563, 57416, U.S.N.M.

Hemiphragma whitfieldi (James).

Monticulipora (Chaetetes) whitfieldi James, Paleontologist, no. 5, 1881, p. 24.

Monticulipora whitfieldi James and James, Jour. Cincinnati Soc. Nat. Hist., 10, 1888, p. 178.—J. F. James, *ibid.*, 16, 1894, p. 200.

Batostoma (Hemiphragma) whitfieldi Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 137.

Hemiphragma whitfieldi Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 286.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 40, p. 8, figs. 15, 16: pl. 4, figs. 1-4; pl. 5, fig. 5.

Eden (Economy, Southgate): Cincinnati, Ohio, and vicinity.

Pleiotypes.—Cat. No. 35393, U.S.N.M.

HEMPRONITES Meek and Hayden. See *Strophomena Rafinesque*.

HEMPRONITES AMERICANUS Whitfield. See *Clitambonites diversus*.

HEMPRONITES APICALIS Whitfield. See *Polytoechia apicalis*.

HEMPRONITES FILITEXTUS Miller. See *Strophomena neglecta*.

HEMPRONITES PROPINQUUS Meek and Worthen. See *Schuchertella propinqua*.

HEMPRONITES SUBPLANUS Meek and Worthen. See *Schuchertella propinqua*.

HEMPRONITES SUBTENTA Miller. See *Strophomena planumbona subtenta*.

Hemisterias Rafinesque.

Not recognized.

Hemisterias Rafinesque, Bull. Soc. Geol. France, 10, 1839, p. 381.—Binney and Tryon's Complete Writings of Constantine Smaltz Rafinesque on Recent and Fossil Conch., 1864, p. 90.

Hemisterias quadriloba Rafinesque.

Hemisterias quadriloba Rafinesque, Binney and Tryon's Complete Writings of Constantine Smaltz Rafinesque on Recent and Fossil Conch., 1864, p. 90, fig. 1. Silurian?: Pennsylvania.

HEMITHIRIS INCREBESCENS D'Orbigny. See *Rhynchotrema inaequivalve*.

HEMITHIRIS SUBTRIGONALIS D'Orbigny. See *Rhynchotrema subtrigonale*.

HEMITRYPA Phillips.Genotype: *H. oculata* Phillips.

Hemitrypa Phillips, Pal. Foss., 1841, p. 27.—McCoy, Synop. Carb. Foss. Ireland, 1844, p. 204.—Pictet, Traité de Paleontologie, 2d ed., 4, 1857, p. 166.—Hall, 26th Ann. Rep. New York State Mus., 1874, p. 97; Rep. State Geol. New York for the year 1884, 1885, p. 36.—Ulrich, Contr. Amer. Pal., 1, 1886, p. 4.—Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 152.—Hall and Simpson, Pal. New York, 6, 1887, p. xxiii.—Miller, N. A. Geol. Pal., 1889, p. 309.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 396, 559.—Cole, Sci. Proc. Roy. Dublin Soc., n. s., 8, 1893, p. 132.—Pocta, Syst. Sil. Boheme, 8, pt. 1, 1894, p. 92.—Whidborne, Devon Fauna England (Pal. Soc. Publ.), 2, pt. 4, 1895, p. 177.—Simpson, 13th Ann. Rep. State Geol. New York for 1893, 1895, pp. 710, 726; 47th Ann. Rep. New York State Mus., 1895, pp. 904, 920.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 282.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, pp. 507, 520.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 39.—Cumings, Amer. Jour. Sci., 17, 1904, p. 49; 30th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1906, p. 1281.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 341.

Hemitrypa dubia Hall. See *Loculipora ambigua* Hall.

Hemitrypa ulrichi Foerste.

Hemitrypa ulrichi Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 152; *ibid.*, 3, 1888, pl. 15, fig. 2; Geol. Surv. Ohio, 7, 1895, p. 599, pl. 28, fig. 2.

Upper Medinan (Brassfield): Near New Carlisle, Ohio.

HERCOCRINUS Hudson.Genotype: *H. elegans* Hudson.

Hercocrinus Hudson, Bull. New York State Mus., 107, 1907, p. 125.—Zittel, Grundzuge Pal., 1, 1910, p. 191.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 549.

Hercocrinus elegans Hudson.

Hercocrinus elegans Hudson, Bull. New York State Mus. Nat. Hist., 1907, 107, p. 125, pl. 9, and text fig. 6.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 549.

Chazy (Valcour): Valcour Island, Lake Champlain, New York.

Hercocrinus ornatus Hudson.

Hercocrinus ornatus Hudson, Bull. 107, New York State Mus., 1907, p. 127, pl. 10, and text fig. 7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 549.

Chazy (Valcour): Valcour Island, Lake Champlain, New York.

HERCYNELLA Kayser.Genotype: *H. beyrichi* Kayser.

Hercynella Kayser, Abhand. Geol. Specialk. Preuss. Thur. Staaten, 2, 1878, p. 101.—Barrande, Syst. Sil., 4, pt. 3, 1911, p. 270.

Hercynella buffaloensis O'Connell.

Hercynella buffaloensis O'Connell, Bull. Buffalo Soc. Nat. Sci., 11, No. 1, 1914, p. 96, pl., figs. 1-3.

Cayuga (Bertie): North Buffalo, New York.

Hercynella canadensis Grabau.

Hercynella canadensis Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 195, pl. 25, figs. 5, 6.

Upper Monroan (Amherstburg): Detroit River region of Michigan and Ontario.

Hercynella patelliformis O'Connell.

Hercynella patelliformis O'Connell, Bull. Buffalo Soc. Nat. Sci., 11, No. 1, 1914, p. 97, pl., figs. 4-6.

Cayuga (Bertie): North Buffalo, New York.

HERMATOSTROMA Nicholson.Genotype: *H. schluteri* Nicholson.

Hermatostroma Nicholson, Mon. British Strom., Pal., Soc., 1886, p. 105; *ibid.*, 1892, pp. 218, 219.—Parks, Univ. Toronto Studies, Geol. Ser., no. 4, 1907, p. 34.—Zittel-Eastman Pal., 2d ed., 1913, p. 123.

Hermatostroma guelphica Parks.

Hermatostroma guelphica Parks, Univ. Toronto Studies, Geol. Series, no. 4, 1907, p. 34, pl. 4, figs. 1, 2; pl. 6, fig. 4, 3.
Niagaran (Guelph): Elora, Ontario.

HERPETOCRINUS Salter. See *Myelodactylus* Hall.**HETEROCRINITES SIMPLEX** Troost. See *Ectenocrinus canadensis*.**HETEROCRINUS** Hall.Genotype: *H. heterodactylus* Hall.

Heterocrinus Hall, Pal. New York, 1, 1847, p. 278.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 24.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 223.—Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 271.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 329.—Billings, Geol. Surv. Canada, dec. 4, 1859, p. 44, fig. 16.—Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 376.—Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 147.—Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 210 (adv. sheets 1866).—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 1.—Zittel, Handb. Pal., 1, 1879, p. 358.—Carpenter, Phil. Trans. Royal Soc. London, 174, 1884, p. 933.—Wachsmuth and Springer (part), Proc. Acad. Nat. Sci. Philadelphia, 3, 1886, pp. 127, 129 (Rev. Pal., pt. 3, sec. 2, pp. 187, 203, 205); *ibid.*, 1890, pp. 355-390.—Miller, N. A. Geol. Pal., 1889, p. 252.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 324, pl. 14, fig. 6; pl. 15, figs. 5a, b.—Bather, Kongl. Sv. Vet. Akad. Handl., 25, 1893, p. 25, fig. 6; Nat. Sci., 12, 1898, p. 343; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 146, fig. 58, 2.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 152.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 713.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 501.—Springer, Geol. Surv. Canada, Mem. 15P, 1911, p. 27; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 212.

Stenocrinus Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, pp. 111, 127, 130, 131 (Rev. Pal., 3, sec. 2, pp. 187, 203, 206, 207).—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 146.—Zittel, Grundsuge Pal., 1, 1910, p. 151. (Genotype: *Heterocrinus heterodactylus* Hall.)

HETEROCRINUS ARTICULOSUS Billings. See *Cremacrinus articulatus*.**HETEROCRINUS BELLEVILLENSIS** W. R. Billings. See *Ohiocrinus bellevillensis*.**HETEROCRINUS CANADENSIS** Billings. See *Ectenocrinus canadensis*.**HETEROCRINUS CONSTRICTUS** Hall. See *Ohiocrinus constrictus*.**HETEROCRINUS CONSTRICTUS** var. **COMPACTUS** Meek. See *Ohiocrinus compactus*.**HETEROCRINUS CONSTRICTUS** var. **CONTRACTUS** Wachsmuth and Springer. See *Ohiocrinus compactus*.**HETEROCRINUS CRASSUS** Meek and Worthen. See *Iocrinus crassus*.**HETEROCRINUS DECACTYLUS** Emmons. See *Glyptocrinus decadactylus*.**HETEROCRINUS EXIGUUS** Meek. See *Heterocrinus exilis exiguus*.**Heterocrinus exilis** Hall.

Heterocrinus exilis Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 213, pl. 5, fig. 16 (adv. sheets 1866 and 1871).—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 5, pl. 1, fig. 12.

Stenocrinus exilis Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 132 (Rev. Pal., pt. 3, sec. 2, p. 208).

Eden (Economy-McMicken): Cincinnati, Ohio, and vicinity.

Heterocrinus exilis exiguus (Meek).

Heterocrinus exiguus Meek, Proc. Acad. Nat. Sci. Philadelphia, 23, 1, 1871, p. 308; *ibid.*, 1872, p. 308.

Heterocrinus exilis var. *exiguus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 293 (Rev. Pal., pt. 1, p. 70).

Eden: Cincinnati, Ohio, and vicinity.

Heterocrinus? geniculatus Ulrich.

Heterocrinus geniculatus Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 16, pl. 7, figs. 13, 13a, 13b, 13c.

Stenocrinus geniculatus Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 132 (Rev. Pal., 3, sec. 2, p. 208).

Eden (Fulton): Cincinnati, Ohio, and vicinity.

Natural mold of *cotype*.—Cat. No. 42219, U.S.N.M.

Heterocrinus? gracilis Hall.

Heterocrinus? gracilis Hall, Pal. New York, 1, 1847, p. 280, pl. 76, figs. 3a, b; 12th Ann. Rep. Regents Univ. State New York, 1860, p. 69.—Ruedemann, Bull.

New York State Mus., 162, 1912, p. 86, pl. 3, fig. 5.

Trenton (Snake Hill): Snake Hill, New York.

Heterocrinus heterodactylus Hall.

Heterocrinus heterodactylus Hall, Pal. New York, 1, 1847, p. 279, pl. 76, figs. 1a-o.—Emmons, Amer. Geology, 1, pt. 2, 1855, pl. 17, fig. 20.—Hall, 12th Ann. Rep. Regents Univ. State New York, 1860, p. 69.—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 12, pl. 1, figs. 1a, b.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, pp. 2, 3.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 724, pl. 3, figs. 5, 5a.

Stenocrinus heterodactylus Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, pp. 130, 132 (Rev. Pal., pt. 3, sec. 2, pp. 206, 208).

Eden: Lewis, Jefferson, and Oneida Counties, New York; Cincinnati, Ohio, and vicinity.

Heterocrinus heterodactylus propinquus Meek.

Heterocrinus heterodactylus propinquus Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 14, pl. 1, figs. 2a, b.

Stenocrinus heterodactylus var. *propinquus* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 132 (Rev. Pal., 3, pt. 2, p. 208), (gen. ref.).

Eden (Economy-McMicken): Cincinnati, Ohio, and vicinity.

HETEROCRINUS INÆQUALIS Billings. See *Cremacrinus inæqualis*.**HETEROCRINUS (ANOMALOCRINUS) INCURVUS** Meek and Worthen. See *Anomalocrinus incurvus*.**HETEROCRINUS ISODACTYLUS** Miller. See *Ohiocrinus compactus*.**Heterocrinus juvenis** Hall.

Heterocrinus juvenis Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 212, pl. 5, figs. 9, 10 (adv. sheets 1866, p. 4, and 1871, pl. 1, figs. 9, 10).—Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 10, pl. 1, figs. 3a-c.—Miller, N. A. Geol. Pal., 1889, p. 252, fig. 329.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 283, fig.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 725, pl. 3, figs. 3, 3b.

Stenocrinus juvenis Wachsmuth and Springer, Proc. Acad. Nat. Sci., Philadelphia 1886, p. 132 (Rev. Pal., pt. 3, sec. 2, p. 208).

Maysville (Corryville): Lebanon, Ohio.

HETEROCRINUS LAXUS Hall. See *Ohiocrinus laxus*.

Heterocrinus milleri Wetherby.

Heterocrinus Milleri Wetherby, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 153, pl. 5, fig. 3.

Stenocrinus Milleri Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 132 (Rev. Pal., pt. 3, sec. 2, p. 208).

Trenton (Curdsville): Mercer County, Kentucky; Kirkfield, Ontario.

HETEROCRINUS OSHANUS Miller. See *Ohiocrinus laxus*.

Heterocrinus pentagonus Ulrich.

Heterocrinus pentagonus Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 176, pl. 5, figs. 10 and 10a.

Stenocrinus pentagonus Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 132 (Rev. Pal., pt. 3, sec. 2, p. 208).

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

HETEROCRINUS? (IOCRINUS) POLYXIO Hall. See *Iocrinus subcrassus*.

HETEROCRINUS SIMPLEX Hall. See *Ectenocrinus simplex*.

HETEROCRINUS SIMPLEX VAR. GRANDIS Meek. See *Ectenocrinus grandis*.

HETEROCRINUS SUBCRASSUS Meek and Worthen. See *Iocrinus subcrassus*.

Heterocrinus tenuis Billings.

Heterocrinus tenuis Billings, Geol. Surv. Canada, Rep. Progress, 1853-56, 1857, p. 273; Geol. Surv. Canada, dec. 4, 1859, p. 50, pl. 4, fig. 6a-b; pl. 10, figs. 1a-e.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 502.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 25.

Stenocrinus tenuis Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 132 (Rev. Pal., pt. 3, sec. 2, p. 208).

Trenton (Curdsville): Ottawa and Kirkfield, Ontario; Montreal, Quebec.

HETEROCRINUS VAUPELI Wetherby. See *Ohiocrinus constrictus*.

HETEROCYSTITES Hall.

Genotype: *H. armatus* Hall.

Heterocystites Hall, Pal. New York, 2, 1852, p. 229.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 303.—Hall, Pal. New York, 3, for 1859, 1861, p. 152.—Miller, N. A. Geol. Pal., 1889, p. 253.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 67, fig. 36, 7.

Heterocystites armatus Hall.

Heterocystites armatus Hall, Pal. New York, 2, 1852, p. 229, pl. 49A, figs. 3a-c.—Jaekel, Stammes. Pelmat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 345.

Niagaran (Lockport): Lockport, New York.

HETERODICTYA Zittel. See *Ptilodictya* Lonsdale.

HETERODICTYA PAVONIA Ulrich. See *Escharopora pavonia*.

HETERONEMA Ulrich and Bassler. Genotype: *H. capillare* Ulrich and Bassler.

Heteronema Ulrich and Bassler, Smith. Misc. Coll., 45, 1904, p. 278.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 57; Zittel-Eastman Textb. Pal., 1913, p. 318.

Heteronema? contextum Ulrich and Bassler.

Heteronema? contextum Ulrich and Bassler, *Smiths. Misc. Coll., Quart.*, 45, 1904, p. 279, pl. 65, fig. 12.

Maysville (Corryville): Morrow, Ohio.

Holotype.—Cat. No. 43132, U.S.N.M.

HETERORTHIS Hall and Clarke.

Genotype: *Orthis clytie* Hall.

Heterorthis Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, pp. 207, 223; 11th Ann. Rep. New York State Geol., 1891, p. 268.—Schuchert, *Zittel-Eastman Textb. Pal.*, 1913, p. 382.

Heterorthis clytie Hall.

Orthis clytie Hall, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 90; 15th Rep., *ibid.*, 18-62, pl. 2, figs. 4, 5.—Miller, *Cincinnati Quart. Jour. Sci.*, 2, 1875, p. 34.—Hall and Whitfield, *Pal. Ohio*, 2, 1875, p. 75, pl. 1, figs. 18, 19.—Hall, 36th Rep. New York State Mus. Nat. Hist., 1884, p. 75, pl. 3, fig. 7.—Lesley, *Geol. Surv. Pennsylvania*, Rep. P 4, 1889, p. 512, figs.

Heterorthis clytie Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, pp. 202, 223, pl. 5B, figs. 20-24.—Bassler, *Bull. Virginia Geol. Surv.*, 2a, pl. 24, fig. 1.

Trenton (Hermitage): Frankfort, Paris, etc., Kentucky; Virginia; Tennessee.

HETEROSPONGIA Ulrich.

Genotype: *H. subramosa* Ulrich.

Heterospongia Ulrich, *Amer. Geol.*, 3, 1889, pp. 234, 239.—Miller, *N. A. Geol. Pal.*, 1889, p. 160.—James, *Jour. Cincinnati Soc. Nat. Hist.*, 14, 1891, p. 71.—Winchell and Schuchert, *Geol. Minnesota*, 3, pt. 1, 1895, p. 78 (Ext., 1893).

Heterospongia aspera Ulrich.

Heterospongia aspera Ulrich, *Amer. Geol.*, 3, 1889, p. 241.—James, J. F., *Jour. Cincinnati Soc. Nat. Hist.*, 14, pt. 1, 1891, p. 72.

Richmond (Arnheim): Marion and Lincoln Counties, Kentucky.

Heterospongia knotti Ulrich.

Heterospongia knotti Ulrich, *Amer. Geol.*, 3, 1889, p. 241, fig. 5.

Heterospongia cfr. *knotti* Foerste, *Bull. Sci. Lab. Denison Univ.*, 14, 1909, p. 303, pl. 9, fig. 2.

Heterospongia subramosa-knotti Foerste, *Ohio Nat.*, 12, 1912, p. 453, pl. 22, fig. 2. Richmond (Arnheim): Near Lebanon, Kentucky.

Holotype.—Cat. No. 46557, U.S.N.M.

Heterospongia subramosa Ulrich.

Heterospongia subramosa Ulrich, *Amer. Geol.*, 3, 1889, p. 240, fig. 6, p. 236.—James, J. F., *Jour. Cincinnati Soc. Nat. Hist.*, 14, pt. 1, 1891, p. 71.—Winchell and Schuchert, *Geol. Minnesota*, 3, pt. 1, 1895 (ext. 1893), p. 79, pl. G, figs. 4-6.

Richmond (Arnheim): Marion and Lincoln Counties, Kentucky.

Cotypes.—Cat. Nos. 46558-46560, U.S.N.M.

HETEROSPONGIA SUBRAMOSA KNOTTI Foerste. See *Heterospongia knotti*.**HETEROTRYPA** Nicholson.

Genotype: *Monticulipora frondosa* D'Orbigny.

Heterotrypa (in part) Nicholson, *Pal. Tabulate Corals*, 1879, p. 291; Genus *Monticulipora*, 1881, pp. 101, 103.—Zittel, *Handb. Pal.*, 1, p. 615.—Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 5, 1882, p. 155; *ibid.*, 6, 1883, p. 83.—Foerd, *Contr. Micro-Pal. Cambro-Sil.*, 1883, p. 20.—Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 6, 1883, pp. 83-85.—Roemer, *Leth. geog.*, pt. 1, *Leth. Pal.*, 1883, p. 471.—Rominger, *Amer. Geol.*, 6, 1890, pp. 114, 119.—Ulrich, *Geol. Sur. Illinois*, 8, 1890, pp. 371, 413; *Geol. Minnesota*, 3, 1893, p. 267.—Zittel's

HETEROTRYPA—Continued.

Textb. Pal. (Engl. ed.), 1896, p. 104.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), 1896, p. 273.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 578.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 31.—Cumings, Amer. Geol., 29, 1902, p. 199.—Ulrich and Bassler, Smith. Misc. Coll., Quart., 47, 1904, pp. 24, 25.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 333.

Heterotrypa affinis (Ulrich).

Amplexopora affinis Ulrich, Geol. Sur. Illinois, 8, 1890, p. 450, pl. 36, figs. 2, 2a. *Monticulipora affinis* James, Jour. Cincinnati Soc. Nat. Hist., 16, pt. 5, 1894, p. 193. *Heterotrypa affinis* Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 289. Richmond (Fernvale): Wilmington, Illinois.
Sections of *holotype*.—Cat. No. 43769, U.S.N.M.

HETEROTRYPA ANDREWSI Nicholson. See *Hallopora andrewsi*.**Heterotrypa foerstei** Nickles.

Heterotrypa foerstei Nickles, Bull. Kentucky Geol. Surv., 5, 1905, p. 48, pl. 2, fig. 5.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 126.
Trenton (Upper): Near Rogers Gap, Scott County, Kentucky.

Heterotrypa frondosa (D'Orbigny).

Monticulipora frondosa D'Orbigny, Prodr. de Pal., 1, 1850, p. 25.—Milne-Edwards and Haime, British Foss. Corals, 1854, p. 265.—Milne-Edwards, Hist. Nat. des. Corall., 3, 1860, p. 276.—White, 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 380, pl. 48, figs. 2, 3.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 420, figs.—Boule and Thevenin, Ann. de Pal., 1, 1906, p. 6, pl. 2, figs. 9, 10; pl. 3, figs. 1, 2.

Chaetetes frondosus Milne-Edwards and Haime, Pol. Foss. Terr. Pal., 1851, p. 267, pl. 19, figs. 5, 5a.—Quenstedt, Röhren- und Sternkorallen, 1881, p. 73, pl. 146, fig. 8 (not 3-5).

Chaetetes frondosus limatus Quenstedt, Röhren- und Sternkorallen, 74, 1881, pl. 146, fig. 9.

Heterotrypa frondosa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 23; *ibid.*, 6, 1883, p. 83.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 289.—Ulrich and Bassler, Smiths. Misc. Coll., Quart., 47, 1904, p. 25, pl. 11, figs. 1-3.

Chaetetes mammulatus (not D'Orbigny) Nicholson, Quart. Jour. Geol. Soc. London, 30, 1874, p. 508, pl. 30, figs. 2, 2b; Pal. Ohio, 2, 1875, p. 207.

Monticulipora (*Heterotrypa*) *mammulata* (not D'Orbigny), Nicholson, Pal. Tabulate Corals, 1879, p. 294, pl. 13, figs. 1, 1b; Genus *Monticulipora*, 1881, p. 104, pl. 6, figs. 1, 1g.

Monticulipora mammulata (not D'Orbigny) James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 16.—James, *ibid.*, 18, 1895, p. 69.

Dekayia frondosa Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 812, pl. 15, figs. 1-1e; pl. 28, fig. 9; pl. 29, fig. 1.

Dekayella cystata Cumings, Amer. Geol., 28, 1901, p. 375, pl. 35, figs. 1-6a.

Dekayia frondosa var. *cystata* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 813, pl. 14, figs. 1, 1a; pl. 28, fig. 3.

Dekayia perfrondosa Cumings, Amer. Geol., 29, 1902, p. 207, 210, 212, pl. 9, figs. 9, 11-13, 15, 16; pl. 10, figs. 1, 6; pl. 11, fig. 6; pl. 12, fig. 2.

Maysville (McMillan): Cincinnati, Ohio, and vicinity.

Fragment of Edwards and Haime's *plesiotrypa*.—Cat. No. 35113, U.S.N.M.

Heterotrypa infecta Ulrich.

Heterotrypa infecta Ulrich, Geol. Surv. Illinois, 8, 1890, p. 414, pl. 37, figs. 2-2d.
Monticulipora infecta J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 77.

Heterotrypa ulrichi-infecta Cumings, Amer. Geol., 29, 1902, p. 212, pl. 9, fig. 3.
Dekayia infecta Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 814, pl. 15, figs. 2, 2a.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

Cotypes.—Cat. No. 43367, U.S.N.M.

Heterotrypa lobata (Cumings).

Dekayia ulrichi-lobata Cumings, Amer. Geol., 29, 1902, p. 203, pl. 9, fig. 2; pl. 10, fig. 5; pl. 11, figs. 3, 4; 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 815, pl. 27, fig. 21.

Dekayia ulrichi-expansa Cumings, Amer. Geol., 29, 1902, p. 212, pl. 9, figs. 5, 6; pl. 11, fig. 7.

Maysville (Fairmount): Manchester Station, etc., Indiana; Cincinnati, Ohio, and vicinity.

Heterotrypa microstigma Cumings and Galloway.

Heterotrypa microstigma Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 76, pl. 8, figs. 1-1c.

Richmond (Waynesville): Big Four Railroad, near Weisburg, Indiana.

Heterotrypa parvulipora Ulrich and Bassler.

Heterotrypa parvulipora Hayes and Ulrich, U. S. Geol. Surv., Folio 95, ill. sheet, 1903, fig. 26.—Ulrich and Bassler, Smiths. Misc. Coll., Quart., 47, 1904, p. 26, pl. 11, figs. 4-6.—Nickles, Bull. Kentucky Geol. Surv. 5, 1905, p. 45, pl. 1, fig. 12.

Trenton (Catheys): Maury County, etc., Tennessee; Kentucky.

Cotypes.—Cat. No. 43186, U.S.N.M.

Heterotrypa paupera (Ulrich).

Dekayia paupera Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 153, pl. 6, figs. 10, 10a.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 817, pl. 15, fig. 3, 3a; pl. 28, fig. 6.

Heterotrypa paupera Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 290.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

Holotype.—Cat. No. 43656, U.S.N.M.

HETEROTRYPA PROLIFICA Ulrich. See *Heterotrypa subramosa-prolifica*.

HETEROTRYPA RAMOSA Nicholson. See *Hallopora ramosa*.

HETEROTRYPA SINGULARIS Ulrich. See *Dekayella singularis*.

Heterotrypa solitaria Ulrich.

Heterotrypa solitaria Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 88, pl. 1, figs. 3-3b.

Maysville (Fairmount): Covington, Kentucky; Maury County, Tennessee.

Holotype.—Cat. No. 43664, U.S.N.M.

Heterotrypa subfrondosa (Cumings).

Dekayia subfrondosa Cumings, Amer. Geol., 29, 1902, p. 204, pl. 9, figs. 7, 8 (as *D. subramosa*); pl. 10, figs. 3, 7, 8; pl. 11, fig. 1; pl. 12, fig. 4; 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 821, pl. 14, figs. 6, 6c; pl. 28, fig. 10.

Maysville (Fairmount): Manchester Station, Indiana; Cincinnati, Ohio, and vicinity.

Heterotrypa subpulchella (Nicholson).

Chaetetes subpulchellus Nicholson, Pal. Ohio, 2, 1875, p. 196, pl. 21, figs. 6, 6a.
Monticulipora (*Heterotrypa*) *subpulchella* Nicholson, Genus *Monticulipora*, 1881,
 p. 134, fig. 23, pl. 5, figs. 2, 2a.

Monticulipora subpulchella James and James, Jour. Cincinnati Soc. Nat. Hist.,
 10, 1888, p. 181.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894,
 p. 204.

Heterotrypa subpulchella Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883,
 p. 83.—Nickles, Bull. Kentucky Geol. Surv., no. 5, 1905, p. 51, pl. 2, fig. 12.

Dekayia perfrondosa-subpulchella Cumings, Amer. Geol., 29, 1902, p. 211, 212,
 pl. 9, fig. 14; pl. 10, fig. 4.

Dekayia subpulchella Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana,
 1908, p. 822, pl. 16, figs. 1, 1a; pl. 28, fig. 11.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

Heterotrypa subramosa (Ulrich).

Atactopora subramosa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 124,
 pl. 12, figs. 6-6c.

Heterotrypa subramosa Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900,
 p. 290.

Dekayia subramosa Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1906,
 p. 823, pl. 15, figs. 5, 5b; pl. 29, fig. 2.

Richmond (Waynesville): Jacksonburg, Hanover, etc., Ohio; Indiana.

Holotype.—Cat. No. 43663, U.S.N.M.

Heterotrypa subramosa prolifica Ulrich.

Heterotrypa prolifica Ulrich, Geol. Surv. Illinois, 8, 1890, p. 413, pl. 37, figs. 1-1d;
 Geol. Minnesota, 3, 1893, p. 268.—Simpson, 14th Ann. Rep. State Geol. New
 York for 1894, 1897, figs. 145, 146 (p. 579).

Monticulipora prolifica J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18,
 1895, p. 75.

Heterotrypa subramosa-prolifca Nickles and Bassler, Bull. U. S. Geol. Surv., 173,
 1900, p. 290.

Dekayella perfrondosa-prolifca Cumings, Amer. Geol., 29, 1902, p. 212 (gen. rel.).

Dekayia prolifica Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908,
 p. 820, pl. 15, figs. 4-4b; pl. 29, fig. 3.

Richmond: Blanchester, Waynesville, etc., Ohio; Richmond, etc., Indiana;
 Illinois; Wisconsin; etc.

Cotypes.—Cat. No. 43368, U.S.N.M.

HETEROTRYPA ULRICHI-INFLECTA Cumings. See *Heterotrypa inflecta*.

HETEROTRYPA VAUPELI Ulrich. See *Nicholsonella vaupeli*.

HEXAMERES Barrande. See *Hexameroceras* Hyatt.

HEXAMEROCERAS Hyatt.

Genotype: *Phragmoceras panderi* Barrande.

Hexamoron (*Hexameres*) Barrande, Syst. Sil. Boheme 2, pt. 1, 1867, pp. 203,
 265.

Hexameroceras Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1884, p. 278.—Foord, Cat.
 Foss. Ceph. British Mus., 1, 1888, p. 242.—Newell, Proc. Boston Soc. Nat.
 Hist., 23, 1888, p. 478.—Jaekel, Zeits. d. d. geol. Gesell., 54, Protok., 1902,
 pp. 8, 68, 80.—Jaekel in Ruedemann, Amer. Geol., 31, 1903, p. 200.

Hexamoceras Miller, N. A. Geol. Pal., 1st App., 1892, p. 696.

Hexameroceras cacabiforme Newell.

Hexameroceras cacabiformis Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 481, figs.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 131, fig.

Hexameroceras cacabiforme Miller, N. A. Geol. Pal., 1st App., 1892, p. 696 (gen. ref.).

Niagaran: Delphi, Indiana.

Hexameroceras delphicolum Newell.

Hexameroceras delphicolum Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 479, figs.—Kindle and Breger, 28th Ann. Rep. Dept. Geol. Nat. Res. Indiana, 1904, p. 475.

Hexameroceras delphicolum Miller, N. A. Geol. Pal., 1st App., 1892, p. 696.

Niagaran: Delphi and Huntington, Indiana.

Hexameroceras hertzeri (Hall and Whitfield).

Cryptoceras Hertzeri Hall and Whitfield, Geol. Surv. Ohio Pal., 2, 1875, p. 150, pl. 8, figs. 7, 8.

Hexameroceras herzeri Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 130, fig. 1378.

Gomphoceras hertzeri Miller, N. A. Geol. Pal., 1889, p. 437 (gen. ref.).

Hexameroceras hertzeri Miller, N. A. Geol. Pal., 1892, p. 696 (gen. ref.).

Niagaran (Guelph): Cedarville, Ohio.

HEXAMOCERAS Miller. See *Hexameroceras* Hyatt.

HEXAMORION Barrande. See *Hexameroceras* Hyatt.

HEXAPORITES Pander. See *Dianulites* Eichwald.

HEXAPORITES FUNGIFORMIS Leuchtenberg. See *Dianulites petropolitana*.

HINDELLA Davidson.

Genotype: *Athyris umbonata* Billings.

Hindella Davidson, Suppl. British Sil. Brach., Pal. Soc., 1882, p. 130.—Miller, N. A. Geol. Pal., 1889, p. 346.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 63, figs. 46–51; 13th Ann. Rep. New York State Geol., 1895, p. 769.—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 148.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 415.

Greenfieldia Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 148. (Genotype: *Hindella whitfieldi* Grabau.)

Hindella? ambigua Savage.

Hindella? ambigua Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 89, pl. 4, figs. 17 and 18.

Upper Medinan (Edgewood): Near Edgewood, Pike County, Missouri; Alexander County, Illinois.

HINDELLA PHOCA Ami. See *Lissatrypa phoca*.

Hindella prinstana (Billings).

Athyris Prinstana Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 145, fig. 122 (advance sheets, 1862).

Meristella prinstana Miller, N. A. Geol. Pal., 1889, p. 354.

Hindella prinstana Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 64, pl. 41, fig. 28; pl. 49, fig. 1.

Athyris turgida Shaler, Bull. Mus. Comp. Zool., 4, 1865, p. 69.

Gamachian (Ellis Bay) and Anticostian (Becsie River): Prinstan Bay, Ellis Bay, etc., Anticosti.

Hindella? (Greenfieldia) rostralis Grabau.

Hindella? (Greenfieldia) rostralis Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 150, pl. 21, figs. 1, 2, 7.

Lower Monroan (Greenfield): Greenfield, Ohio.

Hindella umbonata (Billings).

Athyris umbonata Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 144, fig. 121 (adv. sheets, 1862); Geol. Canada, 1863, p. 317, fig. 331.

Hindella umbonata Davidson, Suppl. British Sil. Brach., Pal. Soc., 1882, p. 130, fig.—Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 64, figs. 46–51; pl. 41, figs. 26, 27, 29, 30.

Meristella umbonata Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 88, pl. 13, fig. 2; Geol. Ohio, 7, 1895, p. 590, pl. 25, fig. 2.

Alexandrian (Ellis Bay) and Anticostian (Becksie River-Gun River): Island of Anticosti.

Upper Medinan (Brassfield): Dayton, Ohio.

Hindella? (Greenfieldia) whitfieldi Grabau.

Hindella? (Greenfieldia) whitfieldi Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 149, pl. 19, fig. 4; pl. 21, figs. 11, 17–19; pl. 30, figs. 8–10.

Meristella bella Whitfield (not Hall), Ann. New York Acad. Sci., 5, 1891, p. 510, pl. 5, figs. 8–10; Pal. Ohio, 7, 1893, p. 412, pl. 1, figs. 8–10.—Sherzer, Geol. Surv. Michigan, 7, pt. 1, 1900, p. 223, pl. 17, figs. 8–10.

Lower Monroan (Greenfield): Greenfield, Ohio.

HINDIA Duncan.

Genotype: *H. sphæroidalis* Duncan.

Hindia Duncan, Ann. Mag. Nat. Hist. (5), 4, 1879, p. 84.—Hinde, Catalogue Fossil Sponges, British Mus., 1883, p. 57.—Zittel, Neues Jahrb. Min., Geol. Pal., 2, 1884, p. 79.—Rauff, Ann. Mag. Nat. Hist., 5th ser., 18, 1886, p. 169.—Hinde, Ann. Mag. Nat. Hist., 5th ser., 19, 1887, p. 67.—Mon. British Foss. Sponges, Palæontographical Soc., 1888, p. 115.—Miller, N. A. Geol. Pal., 1889, p. 160.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 226.—James, Jour. Cincinnati Soc. Nat. Hist., 14, 1891, p. 56.—Rauff, Palæontographica, 40, 1894, p. 327.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 79.—Koken, Die Leitfossilien, Leipzig, 1896, p. 337; Zittel-Eastman Textb. Pal., 1, 1900, p. 51.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 14.—Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 56.

Microspongia, Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 37.—Ulrich, Amer. Geol., 1, 1888, p. 325.—Miller, N. A. Geol. Pal., 1889, p. 161.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 228.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1, 1891, p. 54. (Genotype: *M. gregaria* Miller and Dyer.)

Observation.—Although *Microspongia* has priority it was so poorly defined that its identity with *Hindia* would not be suspected without study of the types.

HINDIA FIBROSA of authors. See *Hindia sphæroidalis*.

Hindia gregaria (Miller and Dyer).

Microspongia gregaria Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 37, pl. 2, fig. 2.—Miller, N. A. Geol. Pal., 1889, p. 161, fig. 108.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1, 1891, p. 54.

Astylospongia gregaria James, J. F., Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 247.

Maysville: Cincinnati, Ohio, and vicinity.

Hindia inaequalis Ulrich and Everett.

Hindia inaequalis Ulrich and Everett, Geol. Surv. Illinois, 8, 1890, p. 275, pl. 2, figs. 4, 4a-b.

Black River (Platteville): Near Dixon, Illinois.

Section of *holotype*.—Cat. No. 46561, U.S.N.M.

Hindia parva Ulrich.

Hindia parva Ulrich, Amer. Geol., 3, 1889, p. 244.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 79, pl. G, figs. 7-9.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 135, pl. 6, fig. 1.

Hindia sphaeroidalis var. *parva* Rauff, Palaeontographica, 40, 1894, p. 333, pl. 15, fig. 2.

Microsporgia parva Miller, N. A. Geol. Pal., 1889, p. 161 (gen. ref.).

Microsporgia gregaria (part) James, Jour. Cincinnati Soc. Nat. Hist., 14, 1891, p. 54.

Trenton: Danville, Frankfort, etc., Kentucky; Tennessee; New Jersey; Wisconsin; Minnesota; etc.

Black River (Decorah): Minneapolis, etc., Minnesota.

Cotypes.—Cat. No. 46562, U.S.N.M.

Hindia sphaeroidalis Duncan.

Calamopora fibrosa Roemer (not Goldfuss), Sil. Fauna West Tennessee, 1860, p. 20, pl. 2, fig. 9.

Hindia fibrosa Hinde, Cat. Foss. Sponges British Mus., 1883, p. 57, pl. 13, figs. 1, 1a-b.—Roemer, Lith. Errat. in Pal. Abhandl. Dames u. Kayser, 2, 1885, p. 63 (310), pl. 4 (27), fig. 17.—Rauff, Sitzungsber. d. Niederrh. Gesell. fur Nat. und Heilk. zu Bonn, Sitz., 1886, pp. 166-172.—Hinde, Ann. Mag. Nat. Hist., 5th ser., 19, 1887, p. 76, figs. 1, 2; Mon. British Foss. Sponges, Pal. Soc., 1888, p. 116.—Girty, 48th Rep. New York State Mus., 2, 1895 (1897), p. 263; 14th Rep. State Geol. New York for 1894, 1897, p. 263, pl. 2, fig. 2.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 297, pl. 33, figs. 1, 2.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 14.

Hindia sphaeroidalis Duncan, Ann. Mag. Nat. Hist., 5th ser., 4, 1879, p. 91, pl. 9, figs. 1-6.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 224, figs. 9, 10, pp. 225, 227.—Rauff, Palaeontographica, 40, 1894, p. 335, pl. 15; pl. 16; pl. 17; figs. 1-4.—Girty, 48th Rep. New York State Mus., 2, 1895 (1897), pl. 2, fig. 2; 14th Rep. State Geol. New York for 1894, 1897, pl. 2, fig. 2; 19th Ann. Rep. U. S. Geol. Surv., 1899, p. 552.—Foerste, Jour. Geol., 11, 1903, p. 714.—Swartz, Maryland Geol. Surv., Low. Dev., 1913, p. 195, pl. 17, figs. 1-4.

Hyalostelia solivaga Ulrich, Geol. Surv. Illinois, 8, 1890, p. 232, pl. 2, fig. 4c.

Astylospongia inornata Hall, 16th Rep. New York State Cab. Nat. Hist., 1863, p. 70.

Sphaerolithes nicholsoni Hinde, Abstract Proc. Geol. Soc., No. 305, 1875, p. 88, in Quart. Jour. Geol. Soc., 31.

Silurian and Early Devonian: Many localities in the United States and Canada. *Plesiotype*.—Cat. No. 46563, U.S.N.M. (*holotype* of *Hyalostelia solivaga*).

HINDIA SPHAEROIDALIS var. **PARVA** Rauff. See *Hindia parva*.**Hindia subrotunda** (James).

Chaetetes subrotundus James, Paleontologist, No. 2, 1878, p. 11.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 31.

Astylospongia subrotundus James, Paleontologist, 5, 1881, p. 34.

Microsporgia? *subrotundus* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 14, 1891, p. 55, fig. 1.

Richmond: Clinton County, Ohio.

HIPPARIONYX CONSIMILARIS Vanuxem. See *Atrypa reticularis*.

HIPPOTHOA DELICATULA James. See *Corynotrypa delicatula*.

HIPPOTHOA INFLATA Nicholson. See *Corynotrypa inflata*.

HOLASAPHUS Matthew. Genotype: *H. centropyge* Matthew.
Holasaphus Matthew, Trans. Roy. Soc. Canada, 2d ser., 1, sec. 4, 1895, p. 202;
 Geol. Surv. Canada, Rep. Cambrian Rocks, Cape Breton, 1903, p. 174.

Holasaphus congeneris (Walcott).
Bathyurus? *congeneris* Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 92, pl. 12, fig. 8.
 Upper Pogonip: Ridge southwest of Wood Cove, Eureka District, Nevada.
Cotype.—Cat. No. 24654, U.S.N.M.

Holasaphus moorei Raymond.
Holasaphus moorei Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 35, pl. 3,
 figs. 7-11.
 Canadian (Beekmantown): St. Anne de Bellevue, Island of Montreal, Quebec.

Holocystis Haeckel. See *Holocystites* Hall.

HOLOCYSTITES Hall. Genotype: *Caryocystites cylindricus* Hall.
Holocystites Hall, 20th Rep. New York State Cab. Nat. Hist., 1868 (extras, 1864),
 p. 311, 380; rev. ed., pp. 353, 429.—Miller, Jour. Cincinnati Soc. Nat.
 Hist., 1, Oct., 1878, p. 129.—Zittel, Handb. Pal., 1, 1879, p. 416.—Miller, N.
 A. Geol. Pal., 1889, p. 253.—Bather, Treatise on Zool., pt. 3, Echinodermata,
 London, 1900, p. 72; Zittel-Eastman Textb. Pal., 1, 1900, p. 183.—Zittel,
 Grundzuge Pal., 1, 1910, p. 91.—Grabau and Shimer, N. A. Index Fossils, 2,
 1910, p. 460.
Holocystis (not Lonsdale, 1855) Haeckel, Amphorideen u. Cystoideen, Leipzig,
 1896, p. 60.
Megacystites Hall, Addenda 20th Rep. New York State Cab. Nat. Hist., 1868,
 p. 380. (New name, in case *Holocystites* be thought to be too much like
Holocystis.)—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 47.
Megacystis Angelin, Icon. Crinoid., 1878, p. 29.

Holocystites abnormis Hall.
Holocystites abnormis Hall, 20th Rep. New York State Cab. Nat. Hist. (extras,
 1864), 1868, p. 312, pl. 12(3), figs. 7, 8; rev. ed., p. 355, pl. 12, figs. 7, 8.—
 Chamberlin, Geol. Wisconsin, 1, 1883, p. 191, fig.
 Niagaran (Racine): Racine, Wisconsin.

Holocystites adipatus Miller.
Holocystites adipatus Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1895,
 p. 623, pl. 2, figs. 1, 2. (Adv. sheets, 1891, p. 13.)
 Clinton (Osgood): Jefferson County, Indiana.

Holocystites affinis Miller and Faber.
Holocystites affinis Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 15, 1892,
 p. 87, pl. 1, figs. 16-18.
 Clinton (Osgood): Near Madison, Indiana.

Holocystites alternatus (Hall).
Caryocystites alternatum Hall, Rep. Supt. Geol. Surv. Wisconsin, 1861, p. 23
 Geol. Wisconsin, 1, 1862, p. 69.

Holocystites alternatus—Continued.

Holocystites alternatus Hall, 20th Rep. New York State Cab. Nat. Hist., 1868 (extras, 1864), p. 312, pl. 12(3), fig. 9; pl. 12a(1), fig. 6; rev. ed., 1870, p. 355, pl. 12, fig. 9, pl. 12a, fig. 6.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 461, fig. 1767.

Holocystis alternata Haeckel, Amphorideen u. Cystoideen, Leipzig, 1896, pl. 2, fig. 28.

Niagaran (Racine): Racine, Wisconsin.

Holocystites amplus Miller.

Holocystites amplus Miller, 18th Rep. Dep. Geol. Nat. Res., Indiana, 1894, p. 262, pl. 2, fig. 1. (Adv. sheets, 1892, p. 8, pl. 2, fig. 1.)

Clinton (Osgood): Near Madison, Indiana.

Holocystites asper Miller and Gurley.

Holocystites asper Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 7, 1895, p. 84, pl. 5, figs. 1, 2.

Clinton (Osgood): Near Madison, Indiana.

Holocystites baculus Miller.

Holocystites baculus Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 105, pl. 10, figs. 5, 5a.

Clinton (Osgood): Ripley County, Indiana.

Holocystites benedicti Miller.

Holocystites benedicti Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 627, pl. 5, fig. 3. (Adv. sheets, 1891.)

Clinton (Osgood): Jefferson County, Indiana.

Holocystites brauni Miller.

Holocystites brauni Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 130.

Clinton (Osgood): Jefferson County, Indiana.

Holocystites canneus Miller.

Holocystites canneus Miller, N. A. Geol. Pal., 1889, p. 253, figs. 332, 333.

Clinton (Osgood): Jefferson County, Indiana.

Holocystites colletti Miller.

Holocystites colletti Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 626, pl. 4, fig. 3. (Adv. sheets, 1891, p. 16.)

Clinton (Osgood): Jefferson County, Indiana.

Holocystites commodus Miller.

Holocystites commodus Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 624, pl. 3, figs. 1, 2, 5, 6. (Adv. sheets, 1891, p. 14.)

Clinton (Osgood): Jefferson County, Indiana.

Holocystites cylindricus (Hall).

Caryocystites cylindricum Hall, Geol. Surv. Wisconsin, Rep. Progr., 1861, p. 23; Geol. Wisconsin, 1, 1862, p. 69.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 91.

Holocystites cylindricus Hall, Adv. Pub., 18th Rep. New York State Cab. Nat. Hist., 1864, p. 7, pl. 1, fig. 7, 8; pl. 3, figs. 4-6; 20th Rep. New York State Cab. Nat. Hist., Doc. Ed., 1868, p. 311, pl. 12, figs. 4-6; pl. 12a, figs. 7-8; rev. ed., 1870, p. 354.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 191, fig.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 461, fig. 1766.

Holocystis cylindrica Haeckel, Amphorideen u. Cystoideen, Leipzig, 1896, p. 60. Niagaran (Racine): Racine, Wisconsin.

Holocystites dyeri Miller.

Holocystites dyeri Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 106, pl. 14 fig. 3.

Clinton (Osgood): Ripley County, Indiana.

Holocystites elegans Miller.

Holocystites elegans Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 136, pl. 6, figs. 2, 3a.

Clinton (Osgood): Jefferson County, Indiana.

Holocystites faberi Miller.

Holocystites faberi Miller, N. A. Geol. Pal., 1889, p. 254, figs. 334, 335.

Clinton (Osgood): Jefferson County, Indiana.

Holocystites globosus Miller.

Holocystites globosus Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 124, pl. 5, figs. 5, 5a, 5b.

Clinton (Osgood): Jefferson County, Indiana.

Holocystites gorbyi Miller.

Holocystites gorbyi Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 624, pl. 2, figs. 3, 4. (Adv. sheets, 1891, p. 14.)

Clinton (Osgood): Jefferson County, Indiana.

Holocystites gyrinus Miller and Gurley.

Holocystites gyrinus Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 5, pl. 1, figs. 1-3.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 747, fig. 1361.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 72, fig. 42.

Clinton (Osgood): Jefferson County, Indiana.

Holocystites hammelli Miller. See *Trematocystis hammelli*.

Holocystites indianensis Miller.

Holocystites indianensis Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1892, p. 625, pl. 3, fig. 7. (Adv. sheets, 1891, p. 15.)

Clinton (Osgood): Jefferson County, Indiana.

Holocystites jolietensis Miller.

Holocystites jolietensis Miller, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 223, pl. 9, figs. 1, 1a.

Niagaran (Racine): Joliet, Illinois.

Holocystites madisonensis Miller.

Holocystites madisonensis Miller, 17th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1892, p. 625, pl. 3, figs. 3, 4. (Adv. sheets, 1891, p. 15.)

Clinton (Osgood): Jefferson County, Indiana.

Holocystites ornatissimus Miller.

Holocystites ornatissimus Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 627, pl. 5, figs. 1, 2. (Adv. sheets, 1891, p. 15.)

Clinton (Osgood): Jefferson County, Indiana.

Holocystites ornatus Miller.

Holocystites ornatus Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 132, pl. 5, figs. 3, 3a, 3b.

Clinton (Osgood): Jefferson County, Indiana.

Holocystites ovatus Hall.

Holocystites ovatus Hall, 20th Rep. New York State Cab. Nat. Hist. (extras, 1864), 1868, p. 313, pl. 12 (3), fig. 3; rev. ed., 1870, p. 357, pl. 12, fig. 2.—Chamberlin, Geol. Wisconsin, 1883, 1, p. 191, fig.

Niagaran (Racine): Waukesha, Wisconsin.

Holocystites papulosus Miller.

Holocystites papulosus Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 628, pl. 5, figs. 7, 8 (adv. sheets 1891, p. 18.—Rowley in Greene's Cont. Indiana Pal., 16, 1903, p. 166, pl. 48, figs. 16-18.

Clinton (Osgood): Jefferson County, Indiana.

Holocystites parvulus Miller.

Holocystites parvulus Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 628, pl. 5, fig. 6 (adv. sheets 1891, p. 18).

Clinton (Osgood): Jefferson County, Indiana.

Holocystites parvus Miller.

Holocystites parvus Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 626, pl. 4, figs. 4, 5 (adv. sheets 1891, p. 16).

Clinton (Osgood): Jefferson County, Indiana.

Holocystites perlongus Miller.

Holocystites perlongus Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 132, pl. 5, figs. 4, 4a.

Clinton (Osgood): Ripley County, Indiana.

Holocystites plenus Miller.

Holocystites plenus Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 135, pl. 6, figs. 2, 2a.

Clinton (Osgood): Jefferson County, Indiana.

Holocystites pustulosus Miller.

Holocystites pustulosus Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 134, pl. 6, figs. 1, 1a.

Niagaran (Laurel): Near Waldron, Indiana.

Holocystites rotundus Miller.

Holocystites rotundus Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 107, pl. 9, figs. 3, 3a, 3b.

Clinton (Osgood): Ripley County, Indiana.

Holocystites scitulus Miller.

Holocystites scitulus Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 624, pl. 2, figs. 5, 6 (adv. sheets 1891, p. 14); N. A. Geol. Pal., 2d. App., 1897, p. 747, fig. 1359.

Clinton (Osgood): Jefferson County, Indiana.

Holocystites scutellatus Hall.

Holocystites scutellatus Hall, 20th Rep. New York State Cab. Nat. Hist., 1868 (extras Dec. 1864), p. 314, pl. 12 (3), fig. 1; rev. ed. 1870, p. 357, pl. 12, fig. 1.

Niagaran (Racine): Waukesha, Wisconsin.

Holocystites spangleri Miller.

Holocystites spangleri Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 626, pl. 4, fig. 6 (adv. sheets 1891, p. 16).

Clinton (Osgood): Jefferson County, Indiana.

Holocystites sphaericus Winchell and Marcy.

Holocystites sphaericus Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1866, p. 111.

Niagaran (Racine): Chicago, Illinois.

Holocystites sphaeroidalis Miller and Gurley.

Holocystites sphaeroidalis Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 7, 1895, p. 85, pl. 5, figs. 3, 4.

Clinton (Osgood): Near Madison, Indiana.

Holocystites splendens Miller and Gurley.

Holocystites splendens Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 5, 1894, p. 7, pl. 1, figs. 7, 9.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 747, fig. 1360.

Clinton (Osgood): Near Madison, Indiana.

Holocystites subglobosus Miller. See *Trematocystis subglobosus*.

Holocystites subovatus Miller.

Holocystites subovatus Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 627, pl. 5, figs. 4, 5 (adv. sheets 1891, p. 17); N. A. Geol. Pal., 1st App., 1892, p. 680, fig. 1237.

Clinton (Osgood): Jefferson County, Indiana.

Holocystites subrotundus Miller.

Holocystites subrotundus Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 187, pl. 9, figs. 2, 2a.

Clinton (Osgood): Ripley, Indiana.

Holocystites tumidus Miller.

Holocystites tumidus Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 184, pl. 9, figs. 1, 1a.

Clinton (Osgood): Ripley, Indiana.

Holocystites turbinatus Miller.

Holocystites turbinatus Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1880, p. 250, pl. 15, figs. 7, 7a; N. A. Geol. Pal., 1889, p. 255, fig. 339.

Clinton (Osgood): Ripley County, Indiana.

Holocystites ventricosus Miller.

Holocystites ventricosus Miller, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 188, pl. 10, fig. 4.

Clinton (Osgood): Ripley County, Indiana.

Holocystites wetherbyi Miller.

Holocystites wetherbyi Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 131, pl. 5, figs. 2, 2a, 2b.

Clinton (Osgood): Ripley County, Indiana.

Holocystites winchelli Hall.

Holocystites winchelli Hall, 20th Rep. New York State Cab. Nat. Hist., 1865 (extras, 1864), p. 313, pl. 12 (3), fig. 3; rev. ed., 1870, p. 356, pl. 12, fig. 3.

Niagaran (Racine): Waukeesa, Wisconsin.

Holocystites wykoffi Miller.

Holocystites wykoffi Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 625, pl. 4, figs. 1, 2 (Adv. sheets, 1891, p. 15).

Clinton (Osgood): Jefferson County, Indiana.

HOLOGRAPTUS Holm.Genotype: *H. expansum* Holm.

Holograptus Holm, Ofver. K. Vet. Akad. Forhandl. 38, No. 9, 1881, p. 45.—Hermann, Geol. Mag., dec. 3, 3, 1886, p. 20.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, No. 4, 1896, p. 265.—Elles and Wood, Mon. British Grapt., Pal. Soc., 1902, p. 74.

Rouvilligraptus Barrois, Ann. Soc. Geol. du Nord, 21, Lille, 1893, p. 109.

Holograptus richardsoni (Hall).

Graptolithus *Richardsoni* Hall, Geol. Surv. Canada, dec. 2, 1865, p. 107, pl. 12, figs. 1-8.

Graptolithus (*Monoprion*) *richardsoni* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 226, pl. 3, fig. 30; rev. ed. (1870), p. 261, pl. 3, fig. 30; p. 223.

Holograptus? *richardsoni* Gurley, Jour. Geol., 4, 1896, p. 99 (gen. ref.).

Rouvilligraptus *Richardsoni* Barrois, Ann. Soc. Geol. du Nord., 21, Lille, 1893, p. 109, pls. 3, 4.

Clonograptus *Richardsoni* Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. 51 (gen. ref.).

Canadian (*Levis*, *Clonograptus* zone): Three miles above River Ste. Anne, Quebec.

HOLOMETOPUS Angelin.Genotype: *H. limbatus* Angelin.

Holometopus Angelin, Pal. Scandinavica, 3d ed., Holmiae, 1878, p. 58.—Zittel, Handb. Pal., 2, 1885, p. 602.—Miller, N. A. Geol. Pal., 1889, p. 550.—Pompeckj, Beit. Phys.-Oekon. Gesell., Königsberg, 1890, p. 86.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, p. 182.

Holometopus angelini Billings.

Holometopus *Angelini* Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 95, fig. 85a, b; p. 281.—Miller, N. A. Geol. Pal., 1889, p. 550, fig. 1013.

Canadian: Point Levis, Quebec (*Levis*, *Diplograptus dentatus* zone); Table Head, Pistclet Bay, four miles north Portland Creek and Cow Head, Newfoundland (Quebec, N. P.).

HOLOPEA Hall.Genotype: *H. symmetrica* Hall

Holopea Hall, Pal. New York, 1, 1847, p. 169.—Salter, Mem. Geol. Surv. Great Britain, 3, 1866, p. 346; *ibid.*, 2d ed., 1881, p. 553; Cat. Camb. and Sil. Foss., 1873, p. 69.—Nicholson, Rep. Pal. Prov. Ontario, pt. 1, 1874, p. 119.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 19, No. 6, 1881, p. 187.—Zittel, Handb. Pal., 2, 1882, p. 188.—Miller, N. A. Geol. Pal., 1889, p. 405.—Koken, Neues Jahrb. f. Min., Geol. Pal., 6, Beilage-Band, 1889, p. 423; Die Leitfossilien, Leipzig, 1896, p. 400; Bull. de l'Acad. Imp. Sci. St. Petersburg, 7, 1897, p. 193.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1064.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 949.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 676.

HOLOPEA Whitfield (part). See *Plethospira* Ulrich.

Holopea ampla Ulrich and Scofield.

Holopea ampla Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1065, pl. 79, figs. 22-25.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 676, fig. 941.

Black River (*Platteville*): Cannon Falls, Minnesota; Mineral Point and Beloit, Wisconsin.

Cotype.—Cat. No. 45837, U.S.N.M.

84243°—Bull. 92—15—40

Holopea antiqua (Vanuxem).

Littorina antiqua Vanuxem, Nat. Hist. New York, Geol., 3, 1842, p. 112, fig. 4.—Hall, *ibid.*, 4, 1843, p. 142, fig. 4; tab. ill. 26, fig. 4.—Mather, *ibid.*, 1, 1843, p. 349, fig. 4.—Owen, Amer. Jour. Sci. Arts, 2d ser., 1, 1846, p. 47, fig. 4.—Emmons, Man. Geol., 1860, p. 133, fig. 102.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 58, pl. 9, fig. 4.

Holopea antiqua Hall, Pal. New York, 3, 1859, p. 294, pl. 54, figs. 2a-b, 3a-b.—Leeley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 283, fig.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 264, pl. 24, figs. 15, 16.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 677, fig. 944.

Manlius or Keyser: Schoharie, Litchfield, etc., New York; New Jersey.

Holopea antiqua pervetusta Hall.

Holopea antiqua var. *pervetusta* Hall, Pal. New York, 3, 1859, p. 295, pl. 54, figs. 4, 5.—Grabau, Michigan, Geol. Surv., Geol. Ser., 1, 1909, p. 178, pl. 28, figs. 4-5.

Holopea pervetusta Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 677, fig. 945.

Helderbergian (Manlius or Keyser): New York.

Upper Monroan (Amherstburg): Detroit River region, Michigan.

Holopea appressa Ulrich and Scofield.

Holopea appressa Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1065, pl. 79, figs. 7-10.

Trenton: Goodhue County, Minnesota (Prosser); Burgin, Kentucky.

Cotypes.—Cat. No. 45838, U.S.N.M.

Holopea arctica Schuchert.

Holopea arctica Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 163, pl. 12, figs. 14-16.

Mohawkian: Head of Frobisher Bay, Baffin Land.

Cotypes.—Cat. No. 28190, U.S.N.M.

HOLOPEA ARENARIA Whitfield. See *Plethospira arenaria*.

HOLOPEA CASSINA Whitfield. See *Plethospira cassina*.

Holopea chicagoensis Winchell and Marcy.

Holopea chicagoensis Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 99, pl. 2, fig. 18.

Niagaran (Racine): Chicago, Illinois.

Holopea concinnula Ulrich and Scofield.

Holopea concinnula Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1066, pl. 79, fig. 6.

Black River (Platteville): Beloit, Wisconsin.

Plastotype.—Cat. No. 46531, U.S.N.M.

Holopea conoidea (Hall).

Murchisonia? *conoidea* Hall, Pal. New York, 2, 1852, p. 13, pl. 4, fig. 7.

Holopea conoidea Whitfield and Hovey, Bull. Amer. Mus. Nat. Hist., 11, pt. 2, 1899, p. 164 (gen. ref.).

Upper Medinan: Lockport, New York.

Holopea dilucula (Hall).

Turbo dilucula Hall, Pal. New York, 1, 1847, p. 12, pl. 3, fig. 7.—Cleland, Bull. Amer. Pal., 4, 1903, p. 14.

Holopea dilucula Miller, N. A. Geol. Pal., 1889, p. 405, fig. 678.

Ozarkian (Little Falls): Little Falls, etc., New York.

Holopea? elongata Hall.

Holopea? elongata Hall, Pal. New York, 3, 1859, p. 295, pl. 54, figs. 6, 7.
Cayugan (Manlius): Schoharie, Manlius, etc., New York.

Holopea excelsa Ulrich and Scofield.

Holopea excelsa Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1067, pl. 79, figs. 11 and 12.

Trenton (Prosser): Wykoff, Sumner, and Hader, Minnesota.

Cotypes.—Cat. N^o. 45839, U.S.N.M.

Holopea gracia Billings.

Holopea Gracia Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 159 (adv. sheets, 1862).—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 72, pl. 3, fig. 17; Quart. Jour. Geol. Soc. London, 31, 1875, p. 549, pl. 26, fig. 17.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 18, pl. 3, fig. 4; ibid., 3, pt. 2, 1895, p. 95, pl. 14, fig. 3.

Niagaran (Guelph): Galt, Ontario.

Holopea grandis Calvin.

Holopea grandis Calvin, Bull. Lab. Nat. Hist. State Univ. Iowa, 1, 1890, p. 177, pl. 3, figs. 1a-b.

Niagaran: Monmouth, Iowa.

Holopea guelphensis Billings.

Holopea Guelphensis Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 343, fig. 351; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 159 (adv. sheets, 1862), fig. 143.—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 343, pl. 15 (6), fig. 18 (extras, 1865); rev. ed., 1870, p. 391, pl. 15, fig. 18.—Nicholson, Quart. Jour. Geol. Soc. London, 31, 1875, p. 549, pl. 26, fig. 18; Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 72, pl. 3, fig. 18.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 193, fig.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 95.

Niagaran (Guelph): Galt, etc., Ontario; Wisconsin.

Holopea harmonia Billings.

Holopea harmonia Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 168, fig. 142 (adv. sheets, 1862).—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 342, rev. ed., 1868 (1870), p. 391.—Koken, Neues Jahrb. Min., Geol. Pal., 6, Beilage-Band, 1889, p. 423.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 94.

Niagaran (Guelph): Galt, etc., Ontario; Wisconsin.

Holopea harpa (Hudson).

Straparollina harpa Hudson, Bull. New York State Mus., 80, 1905, p. 292, pl. 5, figs. 4, 5.

Holopea harpa Raymond, Ann. Carnegie Mus., 4, 1908, p. 212, pl. 53, fig. 13; pl. 55, figs. 16, 17.

Chazyan (Valcour): Valcour Island, New York.

Holopea hubbardi Miller.

Holopea hubbardi Miller, N. A. Geol. Pal., 1st App., 1892, p. 694, fig. 1255; 18th Ann. Rep. Indiana Dep. Geol. Nat. Res., p. 318, pl. 9, figs. 39, 40 (adv. sheets 1892).—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res., Indiana, 1908, p. 964, pl. 40, figs. 11, 11a.

Richmond (Whitewater-Saluda): Madison, Indiana.

HOLOPEA HUDSONI Raymond. See *Trochonema hudsoni*.

Holopea incerta Foerste.

Holopea incerta Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 130, pl. 1, fig. 4.

Trenton (Upper): Near Rogers Gap, Kentucky.

Holopea insignis Ulrich and Scofield.

Holopea insignis Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1065, pl. 7, figs. 1-5.

Black River: Minneapolis, Cannon Falls, and Faribault, Minnesota (Platterville).
Lincoln County, Missouri (Auburn).

Cotypes.—Cat. Nos. 45840, 45841, U.S.N.M.

Holopea lavinia Billings.

Holopea Lavinia Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 2 (adv. sheets 1862).

Trenton: Township of Admaston, Canada.

Holopea leiosoma Billings.

Holopea leiosoma Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 187, fig. 18.
Ozarkian? (Levis—erratic): Point Levis, Quebec.

Holopea magniventra Whitfield.

Holopea magniventra Whitfield, Ann. Rep. for 1877, Wisconsin Geol. Surv., 1878, p. 83; Geol. Wisconsin, 4, 1882, p. 316, pl. 24, figs. 2, 3.

Niagaran (Guelph): Carlton, Wisconsin.

Holopea medioeris (Billings).

Cyclonema medioeris Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1884, p. 56.

Anticostian (Jupiter River): Four miles west of Southwest Point, Anticosti.

HOLOPEA MICROCLATHRATA Hudson. See *Gyronema microclathratum*.

Holopea minuta Savage.

Holopea minuta Savage, Bull. Geol. Surv., Illinois, 23, 1913, p. 102, pl. 5, fig. 3.
Upper Medinan (Edgewood): Near Edgewood, Missouri.

HOLOPEA NANA Meek. See *Cyclora minuta*.

Holopea nashvillensis Ulrich.

Holopea nashvillensis Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1068.

Trenton (Catheys): Nashville, Tennessee.

Holotype.—Cat. No. 45842, U.S.N.M.

Holopea nereis Billings.

Holopea nereis Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 27 (adv. sheets 1862).

Black River (Leray): Pauquettes Rapids, Ottawa River, near L'Original, Ottawa and Island of Montreal, Canada.

Holopea niagarensis Winchell and Marcy.

Holopea niagarensis Winchell and Marcy, Mem. Boston, Soc. Nat. Hist., 1, 1865, p. 99, pl. 2, fig. 17.

Niagaran (Racine): Chicago, Illinois.

HOLOPEA OBESA Whitfield. See *Sinuopea obesa*.

Holopea obliqua Hall.

Holopea obliqua Hall, Pal. New York, 1, 1847, p. 170, pl. 37, figs. 2a-d.—Leahy.
Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 283, fig.

Holopea obliqua—Continued.

Holopea cf. *obliqua* Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 74, pl. 3, fig. 5.

Turbo obliquus Emmons, Amer. Geology, 1, pt. 2, 1855, p. 158, pl. 5, fig. 8; Man. Geol., 1860, p. 98, fig. 87.

Trenton: Middleville and Watertown, New York.

?St. Peter sandstone; Minnesota.

Holopea obscura (Hall).

Turbo? *obscura* Hall, Pal. New York, 1, 1847, p. 12, pl. 3, fig. 8 (sup. 315).

Holopea obscura Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 537 (gen. ref.).

Canadian (Beekmantown): Fort Plain, New York.

Holopea obsoleta (Hall).

Cyclonema? *obsoleta* Hall, Pal. New York, 2, 1852, p. 90, pl. 28, figs. 3a, b.

Holopea obsoleta Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 348 (gen. ref.).

Lower Clinton: Medina and Lockport, New York.

Holopea obsoleta elevata Foerste.

Holopea obsoleta var. *elevata* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 290, pl. 6, fig. 17.

Clinton: Cumberland Gap, Tennessee.

Holopea? occidentalis Nicholson.

Holopea? *occidentalis* Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 85, fig.; Quart. Jour. Geol. Soc. London, 31, 1875, p. 550, 551, fig.—Whiteaves, Pal.

Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 95.

Niagaran (Guelph): Elora, Ontario.

Holopea ophelia Billings.

Holopea Ophelia Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 222, fig. 204.

Chazyan (Quebec-L): Point Rich, Newfoundland.

Holopea ovalis Billings.

Holopea ovalis Billings, Canadian Nat. Geol., 4, 1859, p. 351, fig. 2.

Canadian (Beekmantown): Second Concession of Godmanchester, Canada.

Holopea oxfordensis Ulrich.

Holopea oxfordensis Ulrich, Geol. Minnesota, 3, 1897, pt. 2, p. 1068.

Richmond (Whitewater): Oxford, Ohio.

Cotypes.—Cat. Nos. 45843, 45844, U.S.N.M.

Holopea paludiformis Hall.

Holopea paludiformis Hall, Pal. New York, 1, 1847, p. 171, pl. 37, figs. 3a, 3b.—

Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 3, fig. 2.—

Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 284, figs.—Sardeson,

Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 75.—Ulrich and Scofield, Geol.

Minnesota, 3, pt. 2, 1897, p. 1067.—Ruedemann, Bull. New York State Mus.,

49, 1901, p. 35.

Turbo americanus D'Orbigny, Prodr. de Pal., 1, 1849, p. 6.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 158, pl. 6, fig. 20.

Trenton: Watertown, New York; near Cannon Falls, Minnesota (Prosser).

?St. Peter sandstone; Minnesota.

Holopea parvula Ulrich.

Holopea parvula Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1067, pl. 79, fig. 13.—

Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 187, pl. 12, fig. 30.

Trenton: Near Burgin, Kentucky (Flanagan); Jacksonburg, New Jersey.

Holotype.—Cat. No. 45845, U.S.N.M.

HOLOPEA PERUNDOSA Sardeson. See *Holopea pyrene*.

HOLOPEA PERVETUSTA Grabau and Shimer. See *Holopea antiqua pervetusta*.

Holopea? plauta Raymond.

Holopea? plauta Raymond, Ann. Carnegie Mus., 3, 1906, p. 577; *ibid.*, 4, 1906, p. 214, pl. 54, fig. 9.

Chazy (Crown Point): Valcour Island and Chazy, New York.

Holopea proserpina Billings.

Holopea proserpina Billings, Pal. Foss., 1 Geol. Surv. Canada, 1865, p. 28 (Adv. sheets, 1862.)

Canadian (Beekmantown): Phillipsburg, Quebec.

Holopea pyrene Billings.

Holopea Pyrene Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 145, fig. 91;

Pal. Foss., 1, Geol. Surv. Canada, p. 27, fig. 26. (Adv. sheets, 1862.)—

Koken, Neues Jahrb. f. Min., Geol. Pal., 6, Beilage-Band, 1889, p. 423.—

Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1067, pl. 79, figs. 13-18.—Grabau, Amer. Nat., 36, 1902, p. 925.

Holopea(?) perundosa Sardeson, Bull. Minnesota Acad. Nat. Sci., 3, 1892, p. 336, pl. 6, figs. 12, 13; p. 343.

Black River (Leray): Pauquettes Rapids, Ottawa River, Canada.

Trenton (Prosser): Near Cannon Falls, Minnesota.

Plesiotype.—Cat. No. 45846, U.S.N.M.

Holopea? raymondia Cleland.

Holopea(?) raymondia Cleland, Bull. Amer. Pal., 4, 1903, p. 15, pl. 3, figs. 13, 14.

Ozarkian (Little Falls): Little Falls, New York.

Holopea reversa Hall.

Holopea reversa Hall, Canadian Nat. Geol., 5, 1860, p. 154, fig. 14.

Silurian: Arisaig, Nova Scotia.

Holopea rotunda Ulrich and Scofield.

Holopea rotunda Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1066, pl. 79, figs. 20, 21.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 676, fig. 942.

Black River (Platteville): Dixon, Illinois.

Trenton: Hartsville, Tennessee.

Cotypes.—Cat. Nos. 45847, 45848, U.S.N.M.

Holopea scrutator Raymond.

Holopea scrutator Raymond, Amer. Jour. Sci., 4th ser., 20, 1905, p. 379; Ann. Carnegie Mus., 4, 1908, p. 212, pl. 54, figs. 7, 8.

Chazy: Valcour Island and Chazy, New York (Day Point, Crown Point); East Tennessee (Lenoir).

Holopea similis Ulrich and Scofield.

Holopea similis Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1066, pl. 79, fig. 26.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 676, fig. 942.

Holopea similis—Continued.

Black River (Decorah): Minneapolis and St. Paul, and Goodhue and Fillmore Counties, Minnesota.

Trenton (Prosser): Near Cannon Falls, Minnesota.

?Maysville: Covington, Kentucky.

Holopea subconica Hall.

Holopea subconica Hall, Pal. New York, 3, 1859, p. 294, pl. 54, figs. 1a, 1b.—Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 177.

Cayuga (Manlius): Near Auburn, Cayuga County, New York.

Upper Monroan (Lucas): Salt shaft, Detroit, Michigan.

Holopea supraplana Ulrich and Scofield.

Holopea supraplana Ulrich and Scofield, Geol. Minnesota, 3, 1897, pt. 2, p. 1068, pl. 79, figs. 27, 28.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 187, pl. 12, figs. 31, 32.

Trenton: Kenyon, Minnesota (Prosser); Jacksonburg, New Jersey.

Cotypes.—Cat. No. 45849, U.S.N.M.

Holopea symmetrica Hall.

Holopea symmetrica Hall, Pal. New York, 1, 1847, p. 170, pl. 37, fig. 1.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 186, pl. 12, figs. 26, 27.

Turbo symmetricus Emmons, Amer. Geology, 1, pt. 2, 1855, p. 158, pl. 5, fig. 17.

Trenton: Middleville, New York; Jacksonburg, New Jersey.

HOLOPEA TEXTILIS Grabau and Shimer. See *Strophostylus textilis*.**HOLOPEA TURGIDA** Billings. See *Sinuopea turgida*.**Holopea ventricosa** Hall.

Holopea ventricosa Hall, Pal. New York, 1, 1847, p. 171, pl. 37, figs. 4a, b.—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 284, figs.

Turbo ventricosus Emmons, Amer. Geology, 1, pt. 2, 1855, p. 158, pl. 6, fig. 19a, b.

Trenton: Middleville, New York.

Holopea? voluta Cleland.

Holopea(?) voluta Cleland, Bull. Amer. Pal., 4, 1903, p. 14, pl. 3, fig. 12.

Ozarkian (Little Falls): Little Falls, New York.

HOLOPELLA? SUBULATA Foerste. See *Hormotoma subulata*.**HOMALONOTUS** Koenig.

Genotype: *H. knighti* Koenig.

Homalonotus Koenig, Icones Foss. Sectiles, 1825, p. 7.—Murchison, Sil. Syst., 1839, p. 651.—Edwards, Hist. Nat. d. Crust., 3, 1840, p. 314.—Bronn, Neues Jahrb. f. Min., etc., 1840, pp. 445, 451.—Goldfuss, ibid., 1843, pp. 541, 559.—Castelnau, Essai Syst. Sil. l'Amerique Septent., 1843, p. 20.—Burmeister, Org. der. Tril., Berlin, 1843, p. 99.—Emmrich, Neues Jahrb. f. Min., etc., 1845, p. 43.—Hawle and Corda, Abh. d. k. böhmischen Gesell. d. Wiss., 5 (Extract), 1847, p. 89, pl. 5, fig. 51.—McCoy, Ann. Mag. Nat. Hist., 2d ser., 4, 1849, p. 399.—Barrande, Neues Jahrb. f. Min., etc., 1850, p. 778; Syst. Sil. du Centre Boheme, 1, 1852, p. 577, pls. 29, 34.—Roemer, Neues Jahrb. f. Min., etc., 1853, p. 581.—McCoy, British Pal. Rocks Fossils, 1854, p. 167.—Pictet, Traite de Pal., 2d ed., 1854, p. 504.—Chapman, Canadian Jour., n. s., 1, 1856, p. 272; ibid., 8, 1863, p. 32; Expos. Min. Geol. Canada, 1864, p. 140.—Salter, Mon. British Tril., Pal. Soc., 1865, p. 103; Cat. Camb. Sil. Foss., 1873, p. 133.—Angelin, Pal. Scandinavica, 3d ed., 1878, p. 29.—Zittel, Handb. Pal., 2, 1885, p. 604.—Hall and Clarke, Pal. New York, 7, 1888, pp. 23, 24, fig.—Miller, N. A.

HOMALONOTUS—Continued.

- Geol. Pal., 1889, p. 550.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 23, fig. 14, figs. 4–6.—Grabau, *Bull. Buffalo Soc. Nat. Sci.*, 6, 1899, p. 312; *ibid.*, 7, 1901, p. 221.—Beecher, *Zittel-Eastman Textb. Pal.*, 1, 1900, p. 635.—Lindstrom, *Kongl. Sven. Vet.-Akad. Handl.*, 34, No. 8, 1901, p. 57.—Grabau, *Bull. New York State Mus.*, 45, 1901, p. 221.—Woodward, *Geol. Mag.*, dec. 4, 10, 1903, p. 20.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 316.—Raymond, *Zittel-Eastman Textb. Pal.*, 1913, p. 724.
- Trimerus* Green, *Tril. North America*, 1832, p. 81.—Salter, *Mon. British Tril. Pal. Soc.*, 1865, p. 104.—Zittel, *Handb. Pal.*, 2, 1885, p. 605.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 23.—Clarke, *Arch. Mus. Nac. Rio de Janeiro*, 9, 1890, p. 10, footnote.—Raymond, *Zittel-Eastman Textb. Pal.*, 1913, p. 724.
- Dipleura* Green, *Mon. Tril. North America*, 1832, p. 78.—Salter, *Mon. British Tril. Pal. Soc.*, 1865, p. 105.—Zittel, *Handb. Pal.*, 2, 1885, p. 605.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 23.—Beecher, *Amer. Jour. Sci.*, 4th ser., 3, 1897, p. 105, pl. 3, fig. 27.—Clarke, *Arch. Mus. Nac. Rio de Janeiro*, 9, 1890, p. 10, footnote.—Raymond, *Zittel-Eastman Textb. Pal.*, 1913, p. 724.
- Brongniartia* Eaton, *Geol. Textb.*, 1832, p. 32, pl. 2, fig. 20; *Amer. Jour. Sci.*, 2, 1832, p. 165.—Edwards, *Hist. Nat. d. Crust.*, 3, 1840, p. 346.—Salter, *Mon. British Tril.*, *Pal. Soc.*, 1865, p. 104.—Zittel, *Handb. Pal.*, 3, 1885, p. 605.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 23.
- Brongniatia* Green, *Mon. Tril. North America*, 1832, p. 90.

HOMALONOTUS ATLAS Castelnau. See *Homalonotus delphinocephalus*.

Homalonotus? bistrami Hoek.

- Homalonotus bistrami* Hoek, *Neues Jahrb. Min., Geol. Pal.*, 34, 1912, p. 249, pl. 8, figs. 19, 20.
- Ordovician: Cochabamba, Bolivia.

Homalonotus dawsoni Hall.

- Homalonotus dawsoni* Hall, *Canadian Nat. Geol.*, 5, 1860, p. 155, fig. 17.—Dewar, *Acad. Geol.*, 2d ed., 1868, p. 606, fig. 214; *Canadian Nat. Geol.*, 5, 1860, p. 298, fig. 1; *Acadian Geol.*, Suppl. Chap., 1860, p. 57, footnote; p. 68, fig. 65; *ibid.*, 2d ed., 1878, p. 77, fig. 14; *Geol. Mag.*, dec. 2, 4, 1877, p. 57, fig. 2.
- Silurian (Moydart, Stonehouse): Arisaig, Nova Scotia.

Homalonotus delphinocephalus (Green).

- Trimerus delphinocephalus* Green, *Mon. Tril. North America*, 1832, p. 82, pl. 32, fig. 1.—Harlan, *Trans. Geol. Soc. Pennsylvania*, 1, pt. 1, 1834, p. 106.—Raymond, *Zittel-Eastman Textb. Pal.*, 1913, p. 724, fig. 1402.
- Brongniartia platycephala* Harlan, *Trans. Geol. Soc. Pennsylvania*, 1, pt. 1, 1834, p. 105.
- Homalonotus atlas* Castelnau, *Ess. Syst. Sil. l'Amer. Sept.*, 1843, p. 20, pl. 4, fig. 4.
- Homalonotus giganteus* Castelnau, *ibid.*, p. 20, pl. 3, fig. 1.
- Homalonotus herculeanus* Castelnau, *ibid.*, p. 20, pl. 4, fig. 5.
- Ogygies latissimus* Eaton, *Amer. Jour. Sci. and Arts*, 21, 1832, p. 136.
- Homalonotus delphinocephalus* Murchison, *Sil. Syst.*, 1839, p. 651.—Hall, *Geol. New York*, pt. 4, 1843, p. 103, fig. 34, tab. org. rem., 11, fig. 1.—Owen, *Amer. Jour. Sci. Arts*, 48, 1845, p. 307, pl. 34, p. 311.—Hall, *Pal. New York*, 2, 1852, p. 104, pl. 31, figs. 5a–b; p. 309, pl. 68, figs. 1–14.—Billings, *Canadian Nat. Geol.*, 1, 1856, p. 320, fig. 10.—Lincklaen, 14th Rep. *New York State Cab. Nat. Hist.*, 1861, pl. 8, fig. 4.—Hall, *Trans. Albany Inst.*, 4, 1863, p. 227.—Billings, *Geol. Canada, Geol. Surv. Canada*, 1863, p. 319, fig. 339.—Chapman, *Canadian Jour.*, n. s., 8, 1863, p. 32, fig. 148; p. 212, fig. 222; *Expos. Min.*

Homalonotus delphinocephalus—Continued.

Geol. Canada, 1864, p. 140, fig. 148; p. 184, fig. 222.—Hall, 28th Rep. New York State Mus. Nat. Hist., 1877, doc. ed., pl. 32, figs. 17, 18; mus. ed., 1879, p. 187, pl. 32, figs. 17, 18; 11th Rep. Dep. Geol. Nat. Hist. Indiana, 1882, p. 332, pl. 34, figs. 17, 18.—Miller, N. A. Geol. Pal., 1889, p. 550, fig. 1014.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 288, fig.—Grabau, Bull. Buffalo Soc. Nat. Hist., 7, 1901, p. 221, fig. 153; Bull. New York State Mus. Nat. Hist., 45, 1901, p. 221, fig. 153.—Foerste, Cincinnati Soc. Nat. Hist., Jour. 21, 1909, p. 34, pl. 2, figs. 19a-c.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 317, fig. 1630.

Upper Clinton: Niagara County, etc., New York; Pennsylvania; Maryland; Ontario (Rochester); Lewis County, Kentucky (West Union); ?Waldron, Indiana (Waldron).

Plastotype.—Cat. No. 4910, U.S.N.M.

HOMALONOTUS GIGANTEUS Castelnau. See *Homalonotus delphinocephalus*.

HOMALONOTUS HERCULANEUS Castelnau. See *Homalonotus delphinocephalus*.

Homalonotus linares Salter.

Homalonotus Linares Salter, Quart. Jour. Geol. Soc. London, 17, 1861, p. 66, pl. 5, figs. 1, 2.

Silurian: Mount Illampu, Bolivia.

Homalonotus trentonensis Simpson.

Homalonotus trentonensis Simpson, Trans. Amer. Phil. Soc., n. s., 16, 1890, p. 460, fig. 31.

Brongniartia trentonensis Collie, Bull. Geol. Soc. Amer., 14, 1903, p. 418, pl. 59, figs. 1, 2.

Trenton: Reedsville, Bellefonte, etc., Pennsylvania.

HOMOCRINUS Hall.

Genotype: *H. parvus* Hall.

Homocrinus Hall, Pal. New York, 2, 1852, p. 185; *ibid.*, 3, for 1859, 1861, p. 102.—Meek and Worthen, Geol. Surv. Illinois, 2, 1866, p. 182.—Zittel, Handb. Pal., 1, 1879, p. 361.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, pp. 285, 300 (Rev. Pal., pt. 1, pp. 62, 77); *ibid.*, 1886, p. 115; *ibid.*, 1890, p. 380; Amer. Jour. Sci., 3d ser., 26, 1883, p. 376, fig. 6.—Miller, N. A. Geol. Pal., 1889, p. 255.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 324, pl. 14, fig. 16; Kongl. Sv. Vet. Akad. Handl., 25, No. 2, 1893, p. 101; Geol. Mag., dec. 4, 6, 1899, p. 33, fig. 7; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 179, fig.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 155.—Zittel, Grundzuge Pal., 1, 1910, p. 152.—Slocum, Field Columbian Mus., 2, Geol. Ser., 1908, p. 289, fig. 7.—Kirk, Proc. U. S. Nat. Mus., 46, 1914, p. 473.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 217.

HOMOCRINUS? ÆMULUS Wachsmuth and Springer. See *Cyathocrinus? æmulus*.

HOMOCRINUS ALTERNATUS Hall. See *Dendrocrinus alternatus*.

Homocrinus ancilla (Hall).

Dendrocrinus ancilla Hall, Trans. Albany Inst., 10, 1883, p. 65 (adv. sheets, 1879, p. 9); 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 271, pl. 15, fig. 19.

Homocrinus ancilla Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 144 (Rev. Pal., pt. 3, sec. 2, p. 220).—Slocum, Field Columbian Mus., 2, 1908, p. 289, pl. 85, figs. 9-11.

Niagaran: Waldron, Indiana (Waldron); near Lemont, Illinois (Racine).

HOMOCRINUS ANGUSTATUS Meek and Worthen. See *Dendrocrinus angustatus*.

HOMOCRINUS CONSTRICTUS Hall. See *Ohioocrinus constrictus*.

Homocrinus cylindricus Hall.

Homocrinus cylindricus Hall, Pal. New York, 2, 1852, p. 186, pl. 41, figs. 2a-c, 3a-c.—Slocum, Field Columbian Mus., 2, Geol. Ser., 1908, p. 291, pl. 84, figs. 14, 15.

Niagaran: Lockport, New York (Rochester); near Lemont, Illinois (Racine).

HOMOCRINUS GRACILIS Hall. See *Dendrocrinus gracilia*.

HOMOCRINUS LAXUS Hall. See *Ohioocrinus laxus*.

HOMOCRINUS NUCLEUS Wachsmuth and Springer. See *Botryocrinus nucleus*.

Homocrinus parvus Hall.

Homocrinus parvus Hall, Pal. New York, 2, 1852, p. 185, pl. 41, figs. 1a-f.—Kirk, Proc. U. S. Nat. Mus., 46, 1914, p. 474, pl. 42, figs. 1-8.

Clinton (Rochester): Lockport, New York.

HOMOCRINUS POLYDACTYLUS Shumard. See *Cupulocrinus polydactylus*.

HOMOCRINUS POLYXO Wachsmuth and Springer. See *Botryocrinus polyxo*.

HOMOCRINUS SCOPARIUS Hall. See *Lasiocrinus scoparius*.

HOMOCYSTIS Carpenter. See *Cheirocrinus Eichwald*.

HOMOCYSTITES Barrande. See *Cheirocrinus Eichwald*.

HOMŒOSPIRA Hall and Clarke.

Genotype: *Rhynchospira evax* Hall.

Homœospira Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 112; 13th Ann. Rep. New York State Geol., 1895, p. 792.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 337; 2d ed., 1913, p. 414.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 200; Bull. New York State Mus., 45, 1901, p. 200.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 344.

Homœospira apriniformis Hall.

Atrypa aprinis Hall (not Verneuil), Pal. New York, 2, 1852, p. 230, pl. 57, fig. 7.

Rhynchospira? *aprinis* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 77.

Rhynchospira apriniformis Hall, Pal. New York, 3, 1859, p. 485.

Rhynchonella aprinis Miller, N. A. Geol. Pal., 1889, p. 367.

Homœospira apriniformis Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 111, pl. 83, figs. 24, 25.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 200, fig. 121; Bull. New York State Mus., 45, 1901, p. 200, fig. 121.

Clinton (Rochester): Lockport, New York.

Homœospira beecheri Foerste.

Homœospira beecheri Foerste, Jour. Geol., 11, 1903, p. 709; Bull. Sci. Lab. Denison Univ., 14, 1909, p. 90, pl. 1, figs. 8A, B.

Niagaran (Brownsport): Brownsport Furnace, Decatur County, Tennessee.

Homœospira evax (Hall).

Rhynchospira evax Hall, Trans. Albany Inst., 4, 1863, p. 213.

Retzia evax Hall, 28th Rep. New York State Mus. Nat. Hist., 1879, p. 160, pl. 25, figs. 13-21; 11th Rep. State Geol. Indiana, 1882, p. 302, pl. 25, figs. 13-21.—Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 55, pl. 5, figs. 1-9.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 863, figs.—Miller, N. A. Geol. Pal., 1889, p. 366, fig. 604.

Homœospira evax—Continued.

Homœospira evax Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 112, pl. 50, figs. 15–20 (?32–35).

Homeospira (Retzia) *evax* Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 344, fig. 441.

Niagaran (Waldron): Waldron, etc., Indiana; Newsom, Tennessee.

Homœospira fscellostriata Savage.

Homœospira fscellostriata Savage, Bull. Geol. Surv., Illinois, 23, 1913, p. 87, pl. 4, figs. 23, 24.

Upper Medinan (Edgewood): Louisiana, Missouri.

Homœospira immatura Savage.

Homœospira immatura Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 51, pl. 1, figs. 16–18.

Upper Medinan (Girardeau): Near Thebes, Illinois.

Homœospira pisum Foerste.

Homœospira pisum Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 90, pl. 1, fig. 7.

Niagaran (Brownsport): Bath Springs, Tennessee.

Homœospira schucherti Foerste.

Homœospira schucherti Foerste, Jour. Geol., 11, 1903, p. 709; Bull. Sci. Lab. Denison Univ., 14, 1909, p. 89, pl. 1, fig. 10A, B.

Niagaran (Brownsport): Brownsport Furnace, etc., Tennessee.

Homœospira schucherti elongata Foerste.

Homœospira schucherti-elongata Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 89, pl. 1, fig. 9A, B.

Niagaran (Brownsport): Bath Springs, Tennessee.

Homœospira sobrina (Beecher and Clarke).

Retzia sobrina Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 61, pl. 5, figs. 10–16.

Homœospira sobrina Hall and Clarke, Pal. New York, 8 pt. 2, 1893, p. 112, pl. 50, figs. 26–28.

Niagaran (Waldron): Waldron, Indiana.

Homœospira subcircularis Savage.

Homœospira subcircularis Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 88, pl. 4, figs. 26, 27.

Upper Medinan (Edgewood-Noix): Near Louisiana, Missouri.

HOMOTRYPA Ulrich.

Genotype: *H. curvata* Ulrich.

Homotrypa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 240.—Foord, Contr. Micro-Pal. Cambro-Sil., 1883, p. 9.—Miller, N. A. Geol. Pal., 1889, p. 309.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 370, 409.—Rominger, Amer. Geol., 6, 1890, p. 119.—Ulrich, Geol. Minnesota, 3, 1893, p. 235; Zittel's Textb. Pal., (Engl. ed.), 1896, p. 273.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 575.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 29.—Bassler, Proc. U. S. Nat. Mus., 26, 1903, pp. 565, 566.—Grabau and Shimer, N. A. Index Fossils, 1, p. 128.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 748.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 184, 185; Zittel-Eastman Textb. Pal., 1913, p. 332, fig. 475.

Homotrypa alta Cumings and Galloway.

Homotrypa alta Cumings and Galloway, 37th Ann. Rep. Dep. Geol. and Nat. Res. Indiana, 1913, p. 77, pl. 9, figs. 1-1c; pl. 10, figs. 1-1c.

Maysville (Mount Hope-Fairmount): Big Four Railroad, near Guilford, Indiana.

Homotrypa? arbuscula Ulrich.

Homotrypa arbuscula Ulrich, Geol. Surv. Illinois, 8, 1890, p. 409, pl. 38, figs. 3-3c.—Keyes, Missouri Geol. Surv., 5, 1894, p. 13.

Black River: High Bridge, Kentucky (Lowville); Calhoun County and Dixon, Illinois (Platteville).

Cotypes.—Cat. Nos. 43304, 43305, U.S.N.M.

Homotrypa austini Bassler.

Homotrypa austini Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 584, pl. 24, figs. 5-9.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 833, pl. 16, figs. 7-7b; pl. 29, figs. 11, 11a.

Richmond (Whitewater): Near Wilmington, Ohio.

Cotypes.—Cat. No. 41762, U.S.N.M.

Homotrypa bassleri Nickles.

Homotrypa bassleri Nickles, Jour. Cincinnati Soc. Nat. Hist., 20, 1902, p. 103, 104, fig. 1-5.—Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 578.

Richmond (Arnheim): Lebanon, Oregonia, etc., Ohio.

Homotrypa callosa Ulrich.

Homotrypa callosa Ulrich, Geol. Minnesota, 3, 1893, p. 243, pl. 20, figs. 15-21.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, figs. 139, 140 (p. 576).

Trenton: Burgin and Frankfort, Kentucky (Wilmore); Cannon Falls, Minnesota (Prosser).

Cotypes.—Cat. Nos. 43578, 43579, U.S.N.M.

Homotrypa cincinnatiensis Bassler.

Homotrypa cincinnatiensis Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 576, pl. 21, figs. 4-10.

Maysville (Fairmount): Cincinnati, Ohio, and vicinity; Maysville and McKinney, Kentucky.

Cotypes.—Cat. No. 41744, U.S.N.M.

Homotrypa communis Bassler.

Homotrypa communis Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 581, pl. 23, figs. 1-4.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 839, pl. 17, figs. 1-1d; pl. 29, fig. 12.

Richmond (Waynesville): Oregonia, Waynesville, etc., Ohio; Indiana; Kentucky.

Cotypes.—Cat. No. 41755, U.S.N.M.

Homotrypa? confluens (Foerste).

Monotrypella confluens Foerste, Bull. Sci. Lab. Denison Univ., 2, 1887, p. 172; *ibid.*, 3, 1888, pl. 16, fig. 4.

Homotrypa confluens Foerste, Geol. Surv. Ohio, 7, 1895, p. 600.

Upper Medinan (Brassfield): Dayton, Ohio.

HOMOTRYPA CONSTELLARIFORMIS Cumings. See *Homotrypa ramulosa*.

Homotrypa curvata Ulrich.

Homotrypa curvata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 242, pl. 10, figs. 7-7d.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, figs. 137, 138 (p. 576).—Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 575.—

Homotrypa curvata—Continued.

Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 129.—Cumings, 32d Ann. Rep. Dept. Geol. Nat. Res. Indiana, 1908, p. 840, pl. 17, figs. 3-3b; pl. 29, fig. 13.

Monticulipora curvata J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 71. Maysville (Fairmount): Cincinnati, Ohio, and vicinity.

Cotypes.—Cat. No. 41729, U.S.N.M.

Homotrypa curvata præcipita Bassler.

Homotrypa curvata var. *præcipita* Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 575, pl. 23, fig. 15.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, p. 841, pl. 18, fig. 4; pl. 30, fig. 7, 7a.

Eden (Southgate): West Covington, Kentucky.

Holotype.—Cat. No. 41735, U.S.N.M.

Homotrypa cylindrica Bassler.

Homotrypa cylindrica Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 585, pl. 22, figs. 8-13.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 842, pl. 17, figs. 4, 4a; pl. 29, fig. 14.

Richmond (Whitewater): Richmond and Versailles, Indiana; Oxford, Ohio.

Cotypes.—Cat. No. 41758, U.S.N.M.

Homotrypa dawsoni (Nicholson).

Monticulipora (*Heterotrypa*) *Dawsoni* Nicholson, Genus *Monticulipora*, 1881, p. 141, pl. 5, figs. 3-3f.

Monticulipora dawsoni Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 241.—James and James, *ibid.*, 11, 1888, p. 15.—J. F. James, *ibid.*, 18, 1895, p. 68.

Homotrypa dawsoni Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 291.—Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 581, pl. 25, figs. 9, 10.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 842, pl. 17, figs. 5, 5a; pl. 30, fig. 1.

Richmond (Waynesville): Waynesville, Clarksville, etc., Ohio; Versailles, Indiana.

Plesiotypes.—Cat. No. 41749, U.S.N.M.

Homotrypa dumosa Bassler.

Homotrypa dumosa Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 576, pl. 20, fig. 1; pl. 21, figs. 1-3.

Maysville (Fairmount): Covington, Kentucky, and vicinity.

Cotypes.—Cat. No. 41741, U.S.N.M.

Homotrypa exilis Ulrich.

Homotrypa exilis Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 80; Geol. Minnesota, 3, 1893, p. 236, pl. 19, figs. 10-16.

Black River (Decorah): Minneapolis, Minnesota.

Cotypes.—Cat. No. 43574, U.S.N.M.

Homotrypa flabellaris Ulrich.

Homotrypa flabellaris Ulrich, Geol. Surv. Illinois, 8, 1890, p. 411, pl. 32, figs. 3-3c.—Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 580.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 129.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 845, pl. 18, figs. 1-1b; pl. 30, fig. 2.

Monticulipora flabellaris J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 75.

Maysville (Richmond): Wilmington, Illinois (Fernvale); Ohio; Indiana; Kentucky; Tennessee.

Figured sections of *cotypes*.—Cat. No. 43767, U.S.N.M.

Homotrypa flabellaris frondosa Bassler.

Homotrypa frondosa Cumings (not *Chaetetes frondosus* Edward and Haine, nor *Monticulipora frondosa* D'Orbigny), Amer. Geol., 29, 1902, p. 208, pl. 10, figs. 11, 12; pl. 11, figs. 2, 5; pl. 12, fig. 1.—Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 579.

Homotrypa flabellaris var. *frondosa* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 846, pl. 18, figs. 3, 3b; pl. 30, fig. 3.

Richmond (Arnheim): Harman Station, Indiana; Ohio.

Homotrypa flabellaris spinifera Bassler.

Homotrypa flabellaris var. *spinifera* Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 580, pl. 21, figs. 11–15.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 847, pl. 18, fig. 2.

Maysville and Richmond: Cincinnati, Ohio, and vicinity (Fairmount); Richmond, Indiana; Oxford, etc., Ohio (Richmond).

Holotype.—Cat. No. 41778, U.S.N.M.

HOMOTRYPA FRONDOSA Cumings. See *Homotrypa flabellaris frondosa*.

Homotrypa gelasinoso Ulrich.

Homotrypa gelasinoso Ulrich, Geol. Surv. Illinois, 8, 1890, p. 410, pl. 32, figs. 2–2d.—Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 587.

Monticulipora gelasinoso J. F. James, Jour. Cincinnati Soc. Nat. Hist., 16, 1894, p. 202.

Richmond (Fernvale): Wilmington, Illinois.

Figured sections of *holotype*.—Cat. No. 43768, U.S.N.M.

Homotrypa glabra Cumings and Galloway.

Homotrypa glabra Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 78, pl. 11, figs. 1–1d.

Eden (McMicken): Big Four Railroad, near Guilford, Indiana.

Homotrypa grandis Bassler.

Homotrypa grandis Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 578, pl. 20, figs. 7–10.

Maysville (Leipers): Near Goodlettsville, Davidson County, Tennessee.

Cotypes.—Cat. No. 41764, U.S.N.M.

HOMOTRYPA INSIGNIS Ulrich. See *Homotrypa subramosa-insignis*.

Homotrypa? intercalaris Ulrich.

Homotrypa? intercalaris Ulrich, Geol. Minnesota, 3, 1893, p. 238, fig. 13.

Black River (Decorah): St. Paul and Minneapolis, Minnesota.

Cotypes.—Cat. No. 43577, U.S.N.M.

Homotrypa libana Bassler.

Homotrypa libana Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 578, pl. 22, figs. 1–3.

Richmond (Arnheim): Lebanon, Ohio.

Holotype.—Cat. No. 34329, U.S.N.M.

Homotrypa minnesotensis Ulrich.

Homotrypa minnesotensis Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 79; Geol. Minnesota, 3, 1893, p. 235, pl. 19, figs. 1–9.—Graber and Shimer, N. A. Index Fossils, 1, 1907, p. 129.—Sardeson, Jour. Geol., 9, 1901, p. 12.

Black River (Decorah): Minneapolis, St. Paul, Fountain, etc., Minnesota; Decorah, Iowa; Kentucky; Tennessee.

Cotypes.—Cat. Nos. 43571, 43572, U.S.N.M.

Homotrypa minnesotensis montifera Ulrich.

Homotrypa minnesotensis var. *montifera* Ulrich, Geol. Minnesota, 3, 1893, p. 236, pl. 19, fig. 3a.

Black River (Decorah): St. Paul, Minnesota.

Holotype.—Cat. No. 43573, U.S.N.M.

Homotrypa nicklesi Bassler.

Homotrypa nicklesi Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 586, pl. 22, figs. 4-7.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 847, pl. 18, figs. 6, 6a; pl. 30, fig. 4.

Richmond: Raywick, Kentucky.

Cotypes.—Cat. No. 34328, U.S.N.M.

HOMOTRYPA NITIDA Bassler. See *Homotrypa ramulosa*.**Homotrypa nodulosa** Bassler.

Homotrypa nodulosa Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 582, pl. 23, figs. 5-11; pl. 25, fig. 15.

Richmond: Hanover, Ohio (Waynesville); Richmond, Indiana (Whitewater).

Cotypes.—Cat. No. 41753, U.S.N.M.

Homotrypa obliqua Ulrich.

Homotrypa obliqua Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 243, pl. 10, figs. 6, 6b.—Miller, N. A. Geol. Pal., 1889, fig. 489 (p. 310).—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1896, p. 124.—Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 575, pl. 23, figs. 12-14.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 129.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 848, pl. 19, figs. 1-1b; pl. 30, fig. 6.

Maysville (Fairmount-Corryville): Cincinnati, Ohio, and vicinity.

Holotype and *pleiotypes*.—Cat. Nos. 43671, 41736, U.S.N.M.

Homotrypa pulchra Bassler.

Homotrypa pulchra Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 577, pl. 20, figs. 11-14.

Maysville (Mount Auburn): Cincinnati, Lebanon, etc., Ohio.

Cotypes.—Cat. No. 41747, U.S.N.M.

Homotrypa ramulosa Bassler.

Homotrypa ramulosa Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 585, pl. 25, figs. 1-4.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 849, pl. 19, figs. 2-2b; pl. 30, fig. 8.

Homotrypa constellariformis Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 839, pl. 17, figs. 2-2b.

Homotrypa nitida Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 586, pl. 20, fig. 15; pl. 25, figs. 5-8.—Cumings, 32d Ann. Rep. Dep. Geol. and Nat. Res. Indiana, 1908, p. 848, pl. 18, figs. 5, 5a; pl. 30, figs. 5, 5a.

Richmond (Whitewater): Versailles, Weisburg Station, Osgood, etc., Indiana.

Cotypes.—Cat. Nos. 41771, 41760, U.S.N.M.

Observation.—*H. nitida*, *H. ramulosa*, and *H. constellariformis* have been found to represent the same species, the first being based on the immature branches, the second on the main portions of the zoaria, and the third on the best developed parts.

Homotrypa richmondensis Bassler.

Homotrypa richmondensis Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 582, pl. 24, figs. 1-4.

Homotrypa richmondensis—Continued.

Richmond (Whitewater): Richmond and Versailles, Indiana; Hanover, Oxford, etc., Ohio.

Cotypes.—Cat. No. 41784, U.S.N.M.

Homotrypa separata Ulrich.

Homotrypa separata Ulrich, Geol. Minnesota, 3, 1893, p. 237, pl. 19, figs. 17–20.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 332, fig. 477d.

Black River (Decorah): Minneapolis, Chatfield, etc., Minnesota.

Holotype.—Cat. No. 43576, U.S.N.M.

Homotrypa? similis Foord.

Homotrypa similis Foord, Contr. Micro-Pal. Cambro-Sil., 1883, p. 10, pl. 2, figs. 2–2d.—Ulrich, Geol. Minnesota, 3, 1893, p. 242, pl. 20, figs. 23–33.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 185–187.

Trenton: Ottawa, Ontario; St. Paul, Cannon Falls, etc., Minnesota.

Middle Ordovician (Wassaleum): Uxnorm, near Reval, Esthonia, Russia.

Plesiotypes.—Cat. Nos. 43575, 57273, U.S.N.M.

HOMOTRYPA SOLIDA Nickles and Bassler. See *Eridotrypa solida*.

Homotrypa spinea Cumings and Galloway.

Homotrypa spinea Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 79, pl. 11, figs. 1–1c; pl. 12, figs. 1–1d.

Maysville (Mount Hope-Fairmount): Big Four Railroad, near Guilford, Indiana.

Homotrypa splendens Bassler.

Homotrypa splendens Bassler, Proc. U. S. Nat. Mus., 26, 1903, p. 587, pl. 25, figs. 11–14.

Richmond (Fernvale): Wilmington, Illinois.

Cotypes.—Cat. No. 41761, U.S.N.M.

Homotrypa subramosa Ulrich.

Homotrypa subramosa Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 81; Geol. Minnesota, 3, 1893, p. 239, pl. 19, figs. 21–23.—Ulrich, Zittel's Textb. Pal. (Engl. ed.), fig. 451A–C (not D=*Homotrypa separata* Ulrich) (p. 273).—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 123, fig. 186c.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 332, fig. 477a–c; Bull. U. S. Nat. Mus., 77, 1911, pp. 187–189, figs. 99, 100.

Black River (Decorah) and Trenton (Prosser): St. Paul, Minneapolis, etc., Minnesota; Decorah, Iowa.

Middle Ordovician (Kuckers): Reval, Esthonia, Russia.

Cotypes and *plesiotypes*.—Cat. Nos., 43570, 57274, U.S.N.M.

Homotrypa subramosa insignis (Ulrich).

Homotrypa insignis Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 82.

Homotrypa subramosa var. *insignis* Ulrich, Geol. Minnesota, 3, 1893, p. 239.

Trenton (Prosser): St. Paul and Goodhue and Fillmore Counties, Minnesota—Decorah, Iowa.

Cotypes.—Cat. No. 43998, U.S.N.M.

Homotrypa tuberculata Ulrich.

Homotrypa tuberculata Ulrich, Geol. Minnesota, 3, 1893, p. 240, fig. 14.

Black River (Decorah): Cannon Falls, Minnesota.

Cotypes.—Cat. No. 43580, U.S.N.M.

Homotrypa wortheni (James).

Monticulipora (*Homotrypa*) *wortheni* James, *Paleontologist*, no. 6, 1882, p. 50; no. 7 (1883), pl. 1, fig. 2.

Monticulipora wortheni J. F. James, *Jour. Cincinnati Soc. Nat. Hist.*, 16, 1894, p. 207.—James and James, *ibid.*, 10, 1888, p. 184, pl. 11, figs. 3a, b.

Homotrypa wortheni Bassler, *Proc. U. S. Nat. Mus.*, 26, 1903, p. 582, pl. 24, figs. 10-14.—Cumings, 32d Ann. Rept. Dep. Geol. Nat. Res. Indiana, 1908, p. 849, pl. 19, figs. 3, 3c; pl. 30, fig. 9.

Richmond (Whitewater): Lynchburg, etc., Ohio; Richmond, etc., Indiana.

Plesiotypes.—Cat. No. 41766, U.S.N.M.

Homotrypa wortheni intercellata Bassler.

Homotrypa wortheni var. *intercellata* Bassler, *Proc. U. S. Nat. Mus.*, 26, 1903, p. 584, pl. 24, fig. 17.

Richmond (Whitewater?): Near Osgood and Versailles, Indiana.

Cotypes.—Cat. No. 41768, U.S.N.M.

Homotrypa wortheni prominens Bassler.

Homotrypa wortheni var. *prominens* Bassler, *Proc. U. S. Nat. Mus.*, 26, 1903, p. 584, pl. 24, fig. 15, 16.—Cumings, 32d Ann. Rept. Dep. Geol. Nat. Res. Indiana, 1908, p. 851, pl. 30, fig. 10.

Richmond (Elkhorn): Near Richmond, Indiana.

Cotypes.—Cat. No. 41767, U.S.N.M.

HOMOTRYPELLA Ulrich.

Genotype: *Homotrypella instabilis* Ulrich.

Homotrypella Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1888, p. 83.—Miller, *N. A. Geol. Pal.*, 1889, p. 310.—Ulrich, *Geol. Surv. Illinois*, 8, 1890, pp. 370, 412; *Geol. Minnesota*, 3, 1893, p. 228.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 586.—Nickles and Bassler, *Bull. U. S. Geol. Surv.*, 173, 1900, p. 29.—Ulrich and Bassler, *Smiths. Misc. Coll. Quart.*, 47, 1904, p. 21.—Bassler, *Bull. U. S. Nat. Mus.*, 77, 1911, p. 189; *Zittel-Eastman Textb. Pal.*, 1913, p. 332.

Peronoporella Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 81. (Genotype: *P. dubia* Cumings and Galloway.)

Homotrypella contexta Ulrich.

Homotrypella contexta Ulrich, *Geol. Surv. Illinois*, 8, 1890, p. 412, pl. 32, figs. 5-5b.

Monticulipora contexta J. F. James, *Jour. Cincinnati Soc. Nat. Hist.*, 18, 1895, p. 74.

Richmond (Fernvale): Wilmington, Illinois.

Fragment of *holotype*.—Cat. No. 43763, U.S.N.M.

Homotrypella dubia (Cumings and Galloway).

Peronoporella dubia Cumings and Galloway, 37th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1913, p. 82, pls. 15, 16, 17.

Maysville (Bellevue) and Richmond (Arnheim): Big Four Railroad, near Harmon Station, Indiana.

HOMOTRYPELLA GRACILIS Ulrich. See *Bythopora gracilis*.**Homotrypella granulifera** (Ulrich).

Chaetetes granuliferus Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 2, 1879, p. 128, pl. 12, figs. 9-9b.

Batostomella granulifera Ulrich, *ibid.*, 5, 1882, p. 141.

Homotrypella granulifera Miller, *N. A. Geol. Pal.*, 1889, p. 310.

Homotrypella granulifera—Continued.

Monticulipora (Fistulipora) granulifera J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1896, p. 120.

Trenton (Wilmore): Burgin and Frankfort, Kentucky.

Cotypes.—Cat. No. 43669, U.S.N.M.

Homotrypella hospitalis (Nicholson).

Monticulipora (Prasopora) Selwynii var. hospitalis Nicholson, Genus Monticulipora, 1881, p. 209, fig. 45.

Monticulipora hospitalis James and James, Jour. Cincinnati Soc. Nat. Hist., 11, 1888, p. 26.

Prasopora Selwynii var. hospitalis Nicholson in Steinmann, Neues Jahrb. f. Min., Geol. Pal., 1, 1882, pl. 4, fig. 11.

Prasopora hospitalis Ulrich, Jour. Cincinnati Soc. Nat. Hist., 5, 1882, p. 237.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 371.—Nickles.

Bull. Kentucky Geol. Surv., 5, 1905, p. 57, pl. 3, fig. 10.—Bassler, Proc. U. S. Nat. Mus., 30, p. 49, 1906, pl. 7, figs. 1-3.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 871, pl. 23, figs. 1, 1b; pl. 31, fig. 6.

Homotrypella hospitalis Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 194 (gen. ref.).

Monticulipora (Heterotrypa) winchelli James, Paleontologist, No. 6, 1882, p. 48.

Monticulipora winchelli James, Paleontologist, No. 7, 1883, pl. 1, fig. 5; Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 87.

Richmond: A common species in Ohio, Indiana, Illinois, Kentucky, Tennessee, etc.

Homotrypella hospitalis crassa (Ulrich).

Atactoporella crassa Ulrich, Geol. Minnesota, 3, p. 225, pl. 10, figs. 18-21.

Homotrypella hospitalis crassa Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 183-195, figs. 104, 105.

Trenton: St. Paul and Cannon Falls, Minnesota (Prosser); West Covington, Kentucky.

Middle Ordovician (Wassaleum): Uxnorm, near Reval, Esthonia, Russia.

Holotype and *plesiotype*.—Cat. Nos. 43501, 57279, U.S.N.M.

Homotrypella instabilis Ulrich.

Homotrypella instabilis Ulrich, 14th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1886, p. 83; Geol. Minnesota, 3, 1893, p. 229, pl. 18, figs. 9-20.—Simpson, 14th

Ann. Rep. State Geol. New York for 1894, 1897, figs. 168, 169 (p. 536).—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 189-192, figs. 101, 102.

Black River (Decorah): Minneapolis, St. Paul, Cannon Falls, etc., Minnesota.

Middle Ordovician: Near Reval, Esthonia, Russia.

Cotypes and *plesiotypes*.—Cat. Nos. 43561, 57275, U.S.N.M.

HOMOTRYPELLA MEEKI Ulrich. See *Bythopora meeki*.**Homotrypella multiporata** Ulrich.

Homotrypella multiporata Ulrich, Geol. Minnesota, 3, 1893, p. 230, pl. 18, figs. 21, 22.

Black River (Decorah): St. Paul and Minneapolis, Minnesota.

Figured sections of *holotype*.—Cat. No. 43559, U.S.N.M.

Homotrypella mundula Ulrich.

Homotrypella mundula Ulrich, Geol. Minnesota, 3, 1893, p. 232, fig. 12a-c.

Trenton (Prosser): Decorah, Iowa; Cannon Falls, Minnesota.

Holotype.—Cat. No. 43560, U.S.N.M.

Homotrypella nodosa Ulrich and Bassler.

Homotrypella nodosa Hayes and Ulrich, U. S. Geol. Surv. Folio 95, 1903, ill. sheet, fig. 14, 15.—Ulrich and Bassler, *Smiths. Misc. Coll., Quart.*, 47, 1904, p. 21, pl. 7, figs. 1-3.

Maysville (Leipers): Columbia, Nashville, etc., Tennessee.

Cotypes.—Cat. No. 43178, U.S.N.M.

Homotrypella norwoodi Nickles.

Homotrypella norwoodi Nickles, Bull. Kentucky Geol. Surv., No. 5, 1905, p. 45, pl. 1, fig. 9-11.

Trenton (Cynthiana?): Near Pleasant Valley, Nicholas County, Kentucky.

Homotrypella? ovata Ulrich.

Homotrypella? ovata Ulrich, Geol. Minnesota, 3, 1893, p. 231, pl. 18, figs. 23-30.

Trenton (Prosser): Cannon Falls and Minneapolis, Minnesota.

Cotypes.—Cat. No. 43562, U.S.N.M.

Homotrypella rustica Ulrich.

Homotrypella rustica Ulrich, Geol. Minnesota, 3, 1893, p. 234, pl. 18, figs. 31-33.

Monticulipora (*Fistulipora*) *rustica* J. F. James, Jour. Cincinnati Soc. Nat. Hist., 18, 1896, p. 120.

Homotrypella cf. *rustica* Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1906, p. 851, pl. 19, figs. 5, 5a; pl. 21, fig. 4; pl. 30, fig. 11.

Richmond (Maquoketa): Spring Valley, Minnesota.

Figured sections of *holotype*.—Cat. No. 43557, U.S.N.M.

HOMOTRYPELLA? SUBGRACILIS Ulrich. See *Bythopora subgracilis*.

HORISTOMA Fischer. See *Poleumita* Clarke and Ruedemann.

HORMOCERAS GRACILE Clarke and Ruedemann. See *Actinoceras gracile*.

HORMOCERAS REMOTISEPTUM Clarke and Ruedemann. See *Actinoceras remotiseptum*.

HORMOCERAS TENUIFILUM Clarke and Ruedemann. See *Actinoceras tenuifilum*.

HORMOTOMA Salter.

Genotype: *H. salteri* Ulrich (= *Murchisonia gracilis* Salter not Hall).

Murchisonia (part) of authors.

Hormotoma (subgenus of *Murchisonia*) Salter, Geol. Surv. Canada, Can. Org. Remains, dec. 1, 1859, pp. 18, 22.—Ehler (subgenus *Murchisonia*), Extr. Bull. Soc. d'Etud. Sci. d'Angers, 1877, p. 18.—Koken, Neues Jahrb. f. Min., Geol. Pal., 6, Beilage-Bd., 1889, p. 368.—Donald, Quart. Jour. Geol. Soc. London, 51, 1895, p. 211; *ibid.*, 55, 1899, p. 257.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, pp. 959, 1012.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1906, p. 950.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 648.—Dall, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 525.

Hormotoma? aculeata (Billings).

Lxonema aculeata Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 55.

Anticostian (Gun River, Jupiter River): Near Chaloupe River, Anticosti.

Hormotoma? agilis (Billings).

Murchisonia agilis Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 235.

Hormotoma? agilis Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1014 (gen. ref.).

Canadian (Quebec—G, H): Cape Norman and Table Head, Newfoundland.

Hormotoma anna (Billings).

Murchisonia Anna Billings, Canadian Nat. Geol., 4, 1859, p. 358, figs. 8a-e; Geol. Canada, Geol. Surv. Canada, 1863, p. 119, fig. 32a-f.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 424, figs.

Hormotoma anna Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1014 (gen. ref.).
Canadian: Mingan Islands, Canada.

Hormotoma argylensis (Sardeson).

Murchisonia argylensis Sardeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 7, pl. 5, figs. 11, 12.

Canadian (Shakopee): Near Argyle, Wisconsin; Shakopee and Cannon Falls, Minnesota.

Hormotoma? artemesia (Billings).

Murchisonia Artemesia Billings, Pal. Foss., 1, 1865, Geol. Surv. Canada, p. 345, text fig. 332a, b.

Hormotoma? artemesia Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1013 (gen. ref.).—Baesler, Bull. Virginia Geol. Surv., 29, 1909, pl. 20, figs. 1, 2.

Canadian (Beekmantown): Counties of Leeds and Grenville, Canada; Virginia, etc.

Hormotoma bellicincta (Hall).

Murchisonia bellicincta Hall, Geol. Pal. New York, 1, 1847, p. 179, pl. 39, figs. 1a, b.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 162, pl. 5, figs. 1a, b, 12.—Salter, Quart. Jour. Geol. Soc. London, 15, 1859, p. 380, pl. 13, fig. 11.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 183, fig. 177.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 314.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 18, fig. 7a.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 5, fig. 7.—Walcott, Amer. Jour. Sci. Arts, 3d ser., 35, 1888, p. 237, fig. 2.—Koken, Neues Jahrb. f. Min., Geol. Pal., 6, Beilage Bd., 1889, p. 371.—Lesley, Geol. Surv. Pennsylvania, P 4, 1889, p. 426, figs.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 123 (loc. occ.).

Hormotoma bellicincta Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1017, pl. 70, figs. 15-17.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 650, fig. 887a.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, pl. 40, figs. 12, 12a.

Trenton: Watertown, Middleville, Trenton Falls, etc., New York; Goodhue County, Minnesota (Prosser).

Plesiotypes.—Cat. No. 45850, U.S.N.M. (Ulrich and Scofield).

HORMOTOMA BOYLEI Donald. See *Turritoma boylei*.

Hormotoma? cassina (Whitfield).

Murchisonia cassina Whitfield, Bull. Amer. Mus. Nat. Hist., 9, 1897, p. 179, pl. 1, fig. 7.—Seely, Vermont State Geol. Rep., 7, 1910, pl. 59, fig. 7.

Canadian (Beekmantown): Fort Cassin, Vermont.

Hormotoma confusa (Whitfield).

Murchisonia? confusa Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 54, pl. 8, figs. 16-18.—Seely, Vermont State Geol. Rep., 7, 1910, pl. 60, figs. 6, 8.

Canadian (Beekmantown): Shoreham, Vermont.

Hormotoma fasciata Branson.

Hormotoma fasciata Branson, Trans. Acad. Sci. St. Louis, 18, 1909, p. 45, pl. 7, fig. 16.

Black River (Auburn—Decorah): Lincoln County, Missouri.

Hormotoma funata (Billings).

Murchisonia funata Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 55.

Anticostian (Gun River, Jupiter River): The Jumpers, Anticosti.

Hormotoma gigantea (Billings).

Murchisonia gigantea Billings, Geol. Surv. Canada, Rep. Progress for 1853-1856, 1857, p. 298; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 55 (loc. ref.).

Hormotoma gigantea Schuchert and Twenhofel, Bull. Geol. Soc. Amer., 21, 1910, p. 702.

Gamachian (Ellis Bay): Prinista Bay, Anticosti.

Hormotoma gracilens (Whitfield).

Murchisonia gracilens Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 53, pl. 8, figs. 14, 15.

Hormotoma gracilens Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1014, (gen. ref.).

Canadian (Beekmantown): Beekmantown, New York.

Hormotoma gracilis (Hall).

Murchisonia gracilis Hall, Pal. New York, 1, 1847, p. 181, pl. 39, figs. 4a-c; p. 303, pl. 83, figs. 1a, b.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 162, pl. 17, figs. 9-16; Man. Geol., 1860, p. 102, fig.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 3, fig. 1.—Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, pp. 18, 55.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 315.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 18, fig. 7c.—Whitfield, Geol. Wisconsin, 4, 1882, p. 217, pl. 5, fig. 19.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 157, fig.—Walcott, Amer. Jour. Sci. Arts, 3d ser., 35, 1888, p. 239, fig. 7.—Miller, N. A. Geol. Pal., 1889, p. 411, fig. 687.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 428, figs.—Whiteaves, Canadian Rec. Sci., 5, 1893, p. 320.—Keyes, Missouri Geol. Surv., 5, 1894, p. 146.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 123.

Murchisonia cf. gracilis Sardeeson, Bull. Minnesota Acad. Nat. Sci., 4, 1896, p. 75, pl. 3, fig. 4.

Hormotoma gracilis Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 192.—Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1015, pl. 70, figs. 18-21, 22.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, pl. 40, figs. 13a-b.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 649, figs. 885a-d, 886a-d.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 139, pl. 1, fig. 3.

Trenton-Richmond: Watertown, Middleville, etc., New York (Trenton). Widely distributed in the United States and Canada.

Plesiotypes.—Cat. No. 45851, U.S.N.M. (Ulrich and Scofield).

Hormotoma gracilis angustata (Hall).

Murchisonia? angustata Hall, Pal. New York, 1, 1847, p. 41, pl. 10, figs. 2a, b.

Hormotoma gracilis var. *angustata* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1015, pl. 70, figs. 30-36.—Bassler, Bull. Virginia Geol. Surv., 2A, 1909, pl. 23, fig. 4.

Black River: Watertown, etc., New York; Canada; Virginia; Kentucky; Tennessee; Minnesota; Wisconsin; etc.

Plesiotypes.—Cat. Nos. 45852-45856, U.S.N.M.

Hormotoma gracilis goodhuensis Ulrich and Scofield.

Hormotoma gracilis var. *goodhuensis* Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1015, pl. 70, figs. 42-43.

Black River (Decorah): Goodhue County, Minnesota.

Cotypes.—Cat. No. 45857, U.S.N.M.

Hormotoma gracilis multivolvris Ulrich and Scofield.

Hormotoma gracilis var. *multivolvris* Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, p. 1015, pl. 70, figs. 28-29.

Richmond (Maquoketa): Spring Valley, Minnesota.

Cotypes.—Cat. No. 45858, U.S.N.M.

Hormotoma gracilis sublaxa Ulrich and Scofield.

Hormotoma gracilis var. *sublaxa* Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, p. 1015, pl. 70, figs. 23-25.

Black River (Auburn-Decorah): Auburn, Lincoln County, Missouri.

Cotypes.—Cat. No. 45859, U.S.N.M.

Hormotoma infrequens (Billings).

Murchisonia infrequens Billings, *Canadian Nat. Geol.*, 4, 1859, p. 457.

Hormotoma infrequens Raymond, *Ann. Carnegie Mus.*, 4, 1908, p. 191, pl. 55, fig. 4.

Chazy (Aylmer): Grand Isle, near Cornwall, Canada.

Hormotoma latangularis Branson.

Hormotoma latangularis Branson, *Trans. Acad. Sci. St. Louis*, 18, 1909, p. 44, pl. 7, figs. 11, 12.

Black River (Auburn-Decorah): Auburn, Lincoln County, Missouri.

Hormotoma(?) major (Hall).

Murchisonia major Hall, *Geol. Lake Superior Land Dist.*, 2, 1851, p. 209, pl. 2, figs. 1a-c.—Chamberlin, *Geol. Wisconsin*, 1, 1883, p. 167.—Keyes, *Missouri Geol. Surv.*, 5, 1894, p. 145, pl. 49, figs. 5a-b.

Hormotoma? *major* Ulrich and Scofield, *Geol. Minnesota*, 3, pt. 2, 1897, p. 1013, pl. 71, figs. 5-7.—Grabau and Shimer, *N. A. Index Fossils* 1, 1909, p. 654, fig. 889.

Murchisonia bellicincta Owen, *Rep. Geol. Surv. Wisconsin, Iowa, and Minnesota*, 1852, pl. 2, fig. 8.

Trenton (Prosser and Stewartville): Western shore of Green Bay, etc., Wisconsin; Stewartville, Hader, etc., Minnesota; Iowa; Pike County, Missouri.

Plesiotype and *plastotype*.—Cat. Nos. 17903, 45860, U.S.N.M.

Hormotoma melaniaformis (Shumard).

Murchisonia melaniaformis Shumard, 1st and 2d *Ann. Rep. Geol. Surv., Missouri*, pt. 2, 1855, p. 208, pl. C, fig. 13.—Keyes, *Missouri Geol. Surv.*, 5, 1894, p. 145, pl. 49, fig. 3.

Hormotoma? *melaniaformis* Donald, *Quart. Jour. Geol. Soc. London*, 55, 1899, p. 262 (gen. ref.).

Canadian: Franklin County, Missouri.

Hormotoma multivolvris (Billings).

Murchisonia multivolvris Billings, *Geol. Surv. Canada, Rep. Progr. for 1853-4*, 1857, p. 299; *Cat. Sil. Foss. Anticosti*, *Geol. Surv. Canada*, 1866, p. 18 (loc. ref.).

Richmond (English Head): Macasty Bay, Anticosti.

Hormotoma obelisca (Whitfield).

Murchisonia (Fusispira?) obelisca Whitfield, *Bull. Amer. Mus. Nat. Hist.*, 1, 1896, p. 317, pl. 28, figs. 5, 6.

Murchisonia obelisca Seely, *Vermont State Geol.*, *Rep.* 7, 1910, pl. 60, fig. 5.

Canadian (Beekmantown): Fort Cassin, Vermont.

Hormotoma patriciaense Parks.

Hormotoma patriciaense Parks in Tyrrell, 22d Rep. Ontario Bur. Mines, 1913, p. 36.

Niagaran (Guelph): Severn River, Ontario.

Hormotoma procris (Billings).

Murchisonia Procris Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 34 (adv. sheets, 1862).

Hormotoma procris Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1014 (gen. ref.).

Black River (Leray): Pauquette Rapids, Ottawa River, Canada.

HORMOTOMA RUGOSA Schuchert and Twenhofel. See *Loxonema rugosa*.

Hormotoma salteri Ulrich.

Hormotoma salteri Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1016, pl. 70, figs. 44-51.—Donald, Quart. Jour. Geol. Soc. London, 55, 1899, p. 262, pl. 21, figs.

7-11.—Weller, Geol. Surv. New Jersey Pal., 3, 1903, p. 183, pl. 12, fig. 29.—

Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 649, figs. 887c-d.

Trenton: Between Burgin and Danville, Kentucky (Flanagan); New Jersey.

Cotypes.—Cat. No. 45861, U.S.N.M.

Hormotoma salteri canadensis Ulrich.

Murchisonia (Hormotoma) gracilis Salter, Geol. Surv. Canada, Can. Org. Rem., Dec. 1, 1859, p. 22.—Billings, Geol. Surv. Canada, Geol. Canada, 1863, p. 183, fig. 178.

Hormotoma salteri var. *canadensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1016, pl. 70, fig. 44.

Black River (Leray): Pauquettes Rapids, Ottawa River, Canada; near Lebanon, Tennessee.

Hormotoma salteri nitida Ulrich.

Hormotoma salteri var. *nitida* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1016.

Trenton (Flanagan): Between Burgin and Danville, Kentucky.

Holotypes.—Cat. No. 45862, U.S.N.M.

Hormotoma salteri tennesseensis Ulrich.

Hormotoma salteri var. *tennesseensis* Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1016, pl. 70, fig. 49.

Black River: Between Nashville and Lebanon, Tennessee.

Cotypes.—Cat. No. 45863, U.S.N.M.

Hormotoma simulatrix (Billings).

Murchisonia simulatrix Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 232, text fig. 218.

Hormotoma simulatrix Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1014 (gen. ref.).

Chazy (Quebec, —H—M): Table Head and Point Rich, Newfoundland.

Hormotoma subangulata Ulrich and Scofield.

Hormotoma subangulata Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1016, pl. 70, figs. 37-41.

Black River (Decorah): Chatfield and near Cannon Falls, Minnesota.

Cotypes.—Cat. Nos. 45864-45866, U.S.N.M.

Hormotoma subcarinata Grabau.

Hormotoma subcarinata Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 173, pl. 24, figs. 1-5.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 650.

Upper Monroan: Wayne County, Michigan (Lucas); Amherstburg, Ontario (Amherstburg).

Hormotoma subulata (Conrad).

- Loxonema subulata* Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 273, pl. 16, fig. 14.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 100.
Murchisonia subulata Hall, Pal. New York, 2, 1852, p. 91, pl. 28, figs. 7a, b, c, d.
Holopella? cf. *Loxonema subulata* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1899, p. 291, pl. 5, fig. 21.
Loxonema? (cf. *Holopella*) *subulata* Foerste, Geol. Surv. Ohio, Pal., 7, 1893, p. 556, pl. 30, fig. 21.
 Early Silurian: Medina, Reynales Basin, and Wolcott, New York (Clinton); Todds Fork and Dayton, Ohio (Brassfield).

Hormotoma tenera Savage.

- Hormotoma tenera* Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 96, pl. 6, fig. 9.
 Upper Medinan (Edgewood): Near Edgewood and Louisiana, Missouri.

Hormotoma terebriformis Foerste.

- Hormotoma terebriformis* Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 137, pl. 3, figs. 8a, b.
 Trenton (Upper): Near Rogers Gap, Kentucky.

Hormotoma teretiformis (Billings).

- Murchisonia teretiformis* Billings, Geol. Surv. Canada Rep. Progr. for 1853-1856, 1857, p. 298; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, pp. 18, 55.
Murchisonia bellicincta var. *teretiformis* Whiteaves, Canadian Rec. Sci., 5, 1893, p. 320.
Hormotoma teretiformis Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1014 (gen. ref.).
 Richmond (Charleton): Charleton Point, Anticosti.

Hormotoma trentonensis Ulrich and Scofield.

- Murchisonia bellicincta* Hall (part), Pal. New York, 1, 1847, pl. 39, fig. 1e (not 1a-1d).—Owen, Geol. Rep. Wisconsin, Iowa, Minnesota, 1852, pl. 2, fig. 8.
Murchisonia major Whitfield (not Hall), Geol. Wisconsin, 4, 1882, p. 244, pl. 9, fig. 4.
Hormotoma trentonensis Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 1017, pl. 70, figs. 13, 14.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 650, fig. 887b, 888.
 Trenton: New York, Canada, Minnesota, Illinois, Kentucky, Tennessee.
Holotype.—Cat. No. 45867, U.S.N.M.

Hormotoma tricarinata Grabau.

- Hormotoma tricarinata* Grabau, Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 175, pl. 25, figs. 3-4.
 Upper Monroan (Lucas): Gibraltar quarry, Wayne County, Michigan.

Hormotoma vesta (Billings).

- Murchisonia Vesta* Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 276, fig. 280; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 32, fig. 33 (adv. sheets, 1862).—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 431, fig.—Koken, Neues Jahrb. Min., Geol. Pal., 6, 1889, Beilage-Band, p. 375.
Hormotoma vesta Ulrich, Geol. Minnesota, 3, pt. 2, 1897, p. 1014 (gen. ref.).
 Canadian (Beekmantown): Phillipsburg, Quebec.

Hormotoma whiteavesi Clarke and Ruedemann.

- Hormotoma whiteavesi* Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 72, pl. 8, figs. 5, 9.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 332.

Hormotoma whiteavesi—Continued.

Loxonema magnum Whiteaves (not Whitfield), Geol. Surv. Canada, Pal. Foss., 3, pt. 1, 1884, p. 17 (loc. occ.); Geol. Surv. Canada, Pal. Foss., 3, pt. 2, p. 87, pl. 13, fig. 2.

Niagaran (Guelph): Galt, Hespeler, and Elora, Ontario; Shelby and Rochester New York.

Hormotoma winnipegensis Whiteaves.

Hormotoma winnipegensis Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 192, pl. 21, fig. 1.

Murchisonia winnipegensis Miller, N. A. Geol. Pal., 2d App., 1897, p. 768 (gen. ref.).

Black River or Richmond: Lake Winnipeg, Canada.

HORNERA? *DICHOTOMA* Hall. See *Thamniscus dichotomus*.

HORTHOLUS AMERICANUS D'Orbigny. See *Barrandeoceras americanum*.

HOUGHTONIA Rominger. See *Calapœcia Billings*.

HUDSONASTER Stürtz.

Genotype: *Palæasterina rugosa* Billings.

Palæaster (part) of authors.

Hudsonaster Stürtz, Verh. naturh. Ver. preuss. Rheinl., etc., 1899, p. 224.—Schuchert in Frech, Foss. Cat., 1, Anim., pt. 3, 1914, p. 21; Bull. U. S. Nat. Mus., 88, 1915, p. 53.

Protopalæaster Hudson, Ottawa Nat., 26, 1912, p. 5; *ibid.*, 27, 1913, pp. 77–84.—Raymond, *ibid.*, 1912, p. 105. (Genotype: *P. narrawayi* Hudson.)

Hudsonaster incomptus (Meek).

Palæaster incomptus Meek, Amer. Jour. Sci., 3d ser., 4, 1872, p. 275; Geol. Surv. Ohio, Pal., 1, 1873, p. 64, pl. 4, figs. 5a, b.—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 577, figs.—James, Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 133.

Palæaster simplex Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 29, pl. 1, fig. 6.—Miller, N. A. Geol. Pal., 1889, p. 266, fig. 380.—James, Jour. Cincinnati Soc. Nat. Hist., 18, 1895, p. 132.

Palæaster clarkii Miller, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 102, pl. 3, fig. 5.

Palæaster clarkana Miller, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 236.—James, *ibid.*, 18, 1895, p. 133.

Hudsonaster incomptus Schuchert in Frech, Foss. Cat., 1, Anim., pt. 3, 1914, p. 21; Bull. U. S. Nat. Mus., 88, 1915, p. 61, pl. 6, figs. 1, 2.

Maysville and Richmond: Cincinnati, Ohio, and vicinity; Waynesville, Raysville, etc., Ohio.

Hudsonaster matutinus (Hall).

Asterias matutina Hall, Pal. New York, 1, 1847, pp. 91, 318, pl. 29, figs. 5a, b.

Cœlaster matutina D'Orbigny, Prodr. de Pal., 1, 1849, p. 22 (gen. ref.).

Palæaster matutina Hall, 20th Rep. New York State Cab. Hist., p. 283, rev. ed., 1868 (1870), p. 325, pl. 9, fig. 2.

Hudsonaster matutinus Schuchert in Frech, Foss. Cat., 1, Anim., pt. 3, 1914, p. 21; Bull. U. S. Nat. Mus., 88, 1915, p. 57, pl. 2, fig. 2; pl. 3, fig. 2; pl. 5, figs. 1, 2.

Petraster rigidus (part) Billings, Geol. Surv. Canada, Can. Org. Rem., dec. 3, 1858, pl. 10, fig. 3b (not fig. 3a).—Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 294; rev. ed., 1870, p. 337.

Trenton: Trenton Falls, etc., New York; Lachine, Quebec; Government House Bay, Ontario.

Hudsonaster milleri Schuchert.

Hudsonaster milleri Schuchert in Frech, *Foss. Cat.*, 1, Anim., pt. 3, 1914, p. 22; Bull. U. S. Nat. Mus., 88, 1915, p. 60, pl. 4, fig. 2.

Trenton (Wilmore): Fayette County, Kentucky.

Hudsonaster narrawayi (Hudson).

Protopalaeaster narrawayi Hudson, *Ottawa Nat.*, 26, 1912, p. 25, pl. 1-3; Bull. New York State Mus., 164, 1913, p. 130, pl. 5.—Raymond, *Ottawa Nat.*, 26, 1912, p. 105, figs. 2-4.—Hudson, *Ottawa Nat.*, 27, 1913, pp. 77-84, 2 pls.

Hudsonaster narrawayi Schuchert in Frech, *Foss. Cat.*, 1, Anim., pt. 3, 1914, p. 22; Bull. U. S. Nat. Mus., 88, 1915, p. 59, pl. 1, fig. 1; pl. 2, fig. 1; pl. 4, fig. 1.

Black River: City View Postoffice, Ottawa, Ontario; St. Paul, Minnesota
Stones River (Lebanon): Shelbyville, Tennessee.

Hudsonaster rugosus (Billings).

Palaeasterina rugosa Billings, *Geol. Surv. Canada, Rep. Progress for 1853-54*, 1857, p. 291; *Geol. Surv. Canada, Can. Org. Rem.*, 3, 1858, p. 77, p. 19.—Chapman, *Canadian Jour.*, n. s., 6, 1861, p. 517.—Wright, *Mon. British Foss. Echin.*, Oolitic, 2, pt. 1, 1862 (*Pal. Soc. for 1861*), p. 27.—Billings, *Cat. Sil. Foss. Anticosti*, *Geol. Surv. Canada*, 1866, p. 9.

Hudsonaster rugosa Stürtz, *Verh. naturh. Ver. preuss. Rheinl.*, 56, etc., 1899, p. 225.—Schuchert, Bull. U. S. Nat. Mus., 88, 1915, p. 64, pl. 3, fig. 1.

Richmond (Charleton): Charleton Point, Anticosti.

HUGHMILLERIA Sarle.

Genotype: *H. socialis* Sarle.

Hughmilleria Sarle, Bull. New York State Mus., Pal., 69, 9, 1903, p. 1067.—Clarke, Bull. New York State Mus., 107, 1907, p. 307.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 412.—Clarke and Ruedemann, *Mem. New York State Mus.*, 14, 1912, p. 329.—Clarke, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 785.

Hughmilleria magna Clarke and Ruedemann.

Hughmilleria magna Clarke and Ruedemann, *Mem. New York State Mus.*, 14, 1912, p. 341, pl. 85, figs. 11-19.

Trenton (Schenectady): Schenectady, Duaneburg, and Rotterdam Junction, Schoharie County, New York.

Hughmilleria shawangunk Clarke.

Hughmilleria shawangunk Clarke, Bull. New York State Mus., 107, 1907, p. 308, pl. 4, figs. 1-4; pl. 5, figs. 1-6, 8, 9.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 413, fig. 1714.—Clarke and Ruedemann, *Mem. New York State Mus.*, 14, 1912, p. 342, pls. 64-66; pl. 69, fig. 1.

Medinan (Shawangunk): Otisville, New York; Delaware Water Gap, Pennsylvania.

Hughmilleria socialis Sarle.

Hughmilleria socialis Sarle, Bull. New York State Mus., 69, 1903, p. 1091, pls. 6-9, 10, figs. 1-6, 8, 9; 11-14; 15, figs. 4-6; 24, fig. 1; 25, figs. 1, 2, 4; 26, figs. 3, 5.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 413, fig. 1714.—Clarke and Ruedeman, *Mem. New York State Mus.*, 14, 1912, p. 335, pls. 59-63 (p. 428, fig. 118, *Hughmilleria pittsfordensis* in error).

Cayugan (Pittsford): Pittsford, New York.

Hughmilleria socialis robusta Sarle.

Hughmilleria socialis var. *robusta* Sarle, Bull. New York State Mus., 69, 1903, p. 1097, pl. 21, figs. 1, 2.—Clarke and Ruedemann, *Mem. New York State Mus.*, 14, 1912, p. 340, pl. 63, fig. 16.

Cayugan (Pittsford): Pittsford, New York.

HUNGAIA Walcott.Genotype: *Dikelocephalus magnificus* Billings.*Hungalia* Walcott, *Smiths. Misc. Coll.*, 57, 1914, p. 351.**Hungalia magnifica** (Billings).*Dikelocephalus magnificus* Billings, *Canadian Nat. Geol.*, 5, 1860, p. 307, fig. 5; *Geol. Canada*, *Geol. Surv. Canada*, 1863, p. 235, figs. 255a, b; *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 299, fig. 376.*Remopleurides magnificus* Billings, *Pal. Foss.*, 1, *Geol. Surv. Canada*, 1865, p. 294 (gen. ref.).*Dicellocephalus magnificus* Matthew, *Trans. Roy. Soc. Canada*, 10, sec. 4, 1893, p. 11, footnote.—Frech, *Leth. Geog.*, *Leth. Pal.*, 2, 1897, Bd., pl. 1b, figs. 18a, b.*Apatokcephalus magnificus* Brögger, *Nyt Mag. f. Naturvid.*, 36, 1897, p. 175, fig. 10, p. 184.

Ozarkian? (Levis—erratic): Point Levis, Quebec.

HURONIA Stokes.Genotype: *H. bigsbyi* Stokes.*Huronia* Stokes, *Trans. Geol. Soc. London*, 2d ser., 1, 1824, Expl. pl. 28; *Proc. Geol. Soc. London*, 2, 1838, p. 689; *Trans. Geol. Soc. London*, 2d ser., 5, 1840, p. 710.—Woodward, *Man. Mollusca*, pt. 2, 1851, p. 88, fig. 49.—Saemann, *Palaontographica*, 3, 1852, pp. 156, 161.—Barrande, *Neues Jahrb. f. Min.*, etc., 1855, p. 407.—Billings, *Geol. Surv. Canada*, *Rep. Progr. for 1853–56*, 1857, p. 326.—Barrande, *Syst. Sil. du Centre Boheme*, 2, pt. 3, 1874, p. 784; *Cephalopodes*, *Ext. Syst. Sil. du Centre Boheme*, 1877, p. 104.—Zittel, *Handb. Pal.*, 2, 1884, p. 369.—Hyatt, *Proc. Boston Soc. Nat. Hist.*, 22, 1884, p. 273.—Miller, *N. A. Geol. Pal.*, 1889, p. 442.—Foord, *Cat. Foss. British Mus.*, 1, 1888, p. 199.*HURONIA ANNULATA* Hall. See *Huronia bigsbyi*.**Huronia bigsbyi** Stokes.*Huronia Bigsbyi* Stokes, *Trans. Geol. Soc. London*, 2d ser., 1, 1824, Expl. pl. 28, fig. 1.—Barrande, *Syst. Sil. du Centre Boheme*, 2, pt. 3, 1874, p. 743, pl. 436, figs. 1–3; *Supp.*, 1877, pl. 474, figs. 2–4.*Huronia annulata* Hall, *Geol. Lake Sup. Land District*, Foster and Whitney's *Rep.*, 1851, p. 221, pl. 34, fig. 4.

Niagaran: Drummond Island, Lake Huron.

Huronia distincta Barrande.*Huronia* sp. Stokes, *Trans. Geol. Soc. London*, 2d ser., 5, 1840, p. 710, pl. 40, fig. 2.*Huronia distincta* Barrande, *Syst. Sil. du Centre Boheme*, 11, pt. 3, 1874, p. 745, pl. 231, fig. 2.—Foord, *Cat. Foss. Ceph. British Mus.*, 1, 1888, p. 207.

Niagaran: Drummond Island, Lake Huron.

Huronia minuens Barrande.*Huronia minuens* Barrande, *Syst. Sil. du Centre Boheme*, 11, pt. 3, 1874, p. 744, pl. 435, fig. 4.—Foord, *Cat. Foss. Ceph. British Mus.*, 1, 1888, p. 204.

Niagaran: Drummond Island, Lake Huron.

Huronia obliqua Stokes.*Huronia* sp. Stokes, *Trans. Geol. Soc. London*, 2d ser., 5, pt. 3, 1840, p. 710, pl. 40, fig. 3.*Huronia obliqua* Stokes, *Trans. Geol. Soc. London*, 2d ser., 1, 1824, pl. 28, fig. 4.—Castelnau, *Essai Syst. Sil. l'Amerique Septent.*, 1843, p. 32, pl. 9, fig. 1.—Foord, *Cat. Foss. Ceph. British Mus.*, 1, 1888, p. 205.*Orthoceras* (*Huronia*) sp. Barrande, *Syst. Sil. Boheme*, 2, 3, 1874, p. 743, pl. 231, fig. 3.

Niagaran: Drummond Island, Lake Huron.

Huronion persiphonata (Billings).

Orthoceras persiphonatum Billings, Geol. Surv. Canada, Rep. Progr. for 1853-54, 1857, p. 329; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 57 (loc. ref.).

Huronion persiphonata Foord, Cat. Foss. Ceph. Brit. Mus., 1, 1888, p. 204.

Anticostian (Gun River, Jupiter River): Cormorant Point, Anticosti.

Huronion portlockii Stokes.

Huronion Portlockii Stokes, Proc. Geol. Soc. London, 2, 1838, p. 689; Trans. Geol. Soc. London, 2d ser., 5, 1840, p. 710, pl. 40, fig. 5.—Foord, Cat. Foss. Ceph. British Mus., 2, 1891, p. 383.—Ami, Canadian Rec. Sci., 4, 1891, p. 399.

Orthoceras (*Huronion*) Portlocki Barrande, Syst. Sil. du Centre Boheme, 2, pt. 3, 1874, p. 741, pl. 232, fig. 4.

Niagaran: Drummond Island, Lake Huron.

HURONIA ROMINGERI Barrande. See *Huronion turbinata*.

HURONIA SPHEROIDALIS Stokes. See *Actinoceras sphaeroidale*.

Huronion turbinata Stokes.

Huronion turbinata Stokes, Trans. Geol. Soc. London, 2d ser., 1, 1824, Expl. pl. 28, fig. 3.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 206.

Huronion romingeri Barrande, Syst. Sil. Boheme, 2, 3, 1874, p. 758; Suppl. 1877, pl. 474, figs. 5, 6.

Niagaran: Drummond Island, Lake Huron; Point Detour, Michigan.

Huronion vertebralis Stokes.

Huronion vertebralis Stokes, Trans. Geol. Soc. London, 2d ser., 1, 1824, Expl. pl. 28, figs. 2, 6.—Woodward, Man. Mollusca, pt. 1, 1851, p. 89, fig. 49, footnote; 3d ed., 1875, p. 192, fig. 56.—Hall, Geol. Lake Sup. Land Dist., Foster and Whitney's Rep., 1851, p. 221, pl. 24, fig. 1.—Barrande, Syst. Sil. du Centre Boheme, 2, 1874, pt. 3, p. 746, pl. 231, figs. 6, 7, pl. 436, figs. 5-7.—Roemer, Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 16, fig. 3.—Zittel, Handb. Pal., 2, 1884, p. 369, fig. 508.—Foord, Cat. Foss. Ceph. Brit. Mus., 1, 1888, p. 202.—Miller, N. A. Geol. Pal., 1889, p. 442, text fig. 744.

Orthoceras canadense Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, pp. 321-328; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 57.

Niagaran: Drummond Island, Lake Huron.

Anticostian (Chicotte): Southwest Point, Anticosti.

HYALOSTELIA Zittel.

Genotype: *Hyalonema amithi* Young.

Hyalostelia Zittel, Handb. Pal., 1, 1879, p. 185.—Hinde, Mon. British Foss. Sponges, Pal. Soc., 1888, p. 109.—Koken, Die Leitfossilien, Leipzig, 1896, p. 342.—Zittel-Eastman Textb. Pal., 1, 1900, p. 55; *ibid.*, 2d ed., 1913, p. 62.

Hyalostelia? metissica Dawson.

Hyalostelia Metissica Dawson, Canadian Rec. Sci., 3, 1888, p. 54.—Hinde, Canadian Rec. Sci., 3, 1888, p. 68.—Dawson and Hinde, Trans. Roy. Soc. Canada, 7, sec. 4, 1890, p. 49, fig. 20.—Dawson, *ibid.*, 2d ser., 2, sec. 4, 1896, p. 108, fig. 17, pl. 3, fig. 10.

Pyritonema metissicum Rauff, Palaeontographica, 40, 1894, p. 261.

Canadian? (Levis?): Little Metis, Quebec.

HYALOSTELIA SOLIVAGA Ulrich. See *Hindia sphaeroidalis*.

HYATTELLA Hall and Clarke. See *Hyattidina* Schuchert.

HYATTELLA JUNIA Hall and Clarke. See *Hyattidina congesta junia*.

HYATTIDINA Schuchert.Genotype: *Atrypa congesta* Conrad.

Hyattella Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 61, fig. 45; 13th Ann. Rep. New York State Geol., 1895, p. 767.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 338.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 348.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 204; Bull. New York State Mus., 45, 1901, p. 204.

Hyattidina (*Hyattella* preoccupied) Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 415.

Hyattidina charletona Twenhofel.

Hyattidina charletona Twenhofel, Bull. Victoria Mem. Mus., 3, 1914, p. 34, pl. 1, figs. 6, 7.

Richmond (Charleton): Charleton Point, Anticosti.

Hyattidina congesta (Conrad).

Atrypa congesta Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 265, pl. 16, fig. 18.—Hall, Geol. New York, Rep. 4th Dist., 1843, p. 71, fig. 2; Pal. New York, 2, 1852, p. 67, pl. 23, fig. 1.—Billings, Canadian Nat. Geol., 1, 1856, p. 136, pl. 2, fig. 4.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 823, fig. 632.

Atrypa quadricostata Hall, Pal. New York, 2, 1852, p. 68, pl. 23, fig. 2.

Triplelesia? *congesta* Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 77.

Triplelesia? *quadricostata* Hall, *ibid.*, 1859, p. 78.

Rhynchonella quadricostata Miller, N. A. Geol. Pal., 1889, p. 369.

Camerella congesta Nettelroth, Kentucky Fossil Shells, Mem. Kentucky Geol. Surv., 1889, p. 48.—Leesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 112, figs.

Hyattella congesta Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 61, fig. 45; pl. 40, figs. 23–28; pl. 81, figs. 26–28.—Grabau, Bull. New York State Mus., 45, 1901, pp. 204, 205, figs. 131, 131a; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 204, figs. 131, 131a.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 348, figs. 451–452.

Clinton (Lower): Rochester, Reynales Basin, etc., New York; Ontario.

Anticostian (Gun River): Island of Anticosti.

Plesiotypes.—Cat. No. 51340, U.S.N.M. (Nettelroth).

Hyattidina congesta junia (Billings).

Athyris junia Billings, Catalogue Sil. Foss. Anticosti, 1866, p. 46.

Hyattella junia Hall and Clarke, Pal. New York, 8, pt. 2, 1893, p. 62, pl. 40, figs. 29–31.

Anticostian (Gun River): Six miles east of Otter River, Jupiter River, and the Jumpers, Anticosti.

Hyattidina? lamellosa (Weller).

Hyattella? lamellosa Weller, Geol. Surv. New Jersey, Rep. Pal., 3, 1903, p. 258, pl. 23, figs. 15–18.

Helderbergian (Rondout): Two miles south of Tristates, New York.

HYBOCRINUS Billings.Genotype: *H. conicus* Billings.

Hybocrinus Billings, Geol. Surv. Canada, Rep. Progr., 1853–56, 1857, p. 274; Geol. Surv. Canada, dec. 4, 1859, p. 23.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 8th ser., 21, 1874, p. 5.—Zittel, Handb. Pal., 1, 1879, p. 350.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, pp. 285, 297, 373 (Rev. Pal., 1, p. 74, 150); *ibid.*, 1886, pp. 110, 119, 122; *ibid.*, 1890, pp. 355, 390, 393, pl. 10, fig. 7.—Wetherby, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 152.—Carpenter, Quart. Jour. Geol. Soc. London, 38, 1882, pp. 298,

HYBOCRINUS—Continued.

305.—Wachsmuth and Springer, Amer. Jour. Sci., 3d ser., 26, 1883, p. 343.—Miller, N. A. Geol. Pal., 1889, p. 255.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 324, pl. 14, fig. 3; Kongl. Sv. Vet. Akad. Handl., 25, No. 2, 1893, p. 21; Geol. Mag., dec. 4, 6, 1889, p. 33, fig. 6; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 145, fig. 57, 3.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 151.—Zittel, Grundzüge Pal., 1910, p. 151.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 500.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, pp. 13–23; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 211.

HYBOCRINUS (ANOMALOCRINUS) Meek and Worthen. See *Anomalocrinus* Meek.

Hybocrinus conicus Billings.

Hybocrinus conicus Billings, Geol. Surv. Canada, Rep. Progr. for 1853–54, 1857, p. 274; Geol. Surv. Canada, dec. 4, 1859, p. 29, pl. 2, figs. 2a, b.—Wetherby, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 153.—Miller, N. A. Geol. Pal., 1889, p. 255, fig. 341.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, pl. 4, fig. 6.

Trenton (Curdsville): Ottawa, Ontario; Mercer County, Kentucky.

HYBOCRINUS? (ANOMALOCRINUS) INCURVUS Meek and Worthen. See *Anomalocrinus incurvus*.

Hybocrinus pristinus Billings.

Hybocrinus pristinus Billings, Geol. Surv. Canada, dec. 3, 1858, p. 25, figs. 4, 5; dec. 4, 1859, p. 23, pl. 1, fig. 2a.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 501.

Chazy (Aylmer): Caughnawaga, and Islands of Montreal, Jesus, and Bizard, Canada.

Hybocrinus tumidus Billings.

Hybocrinus tumidus Billings, Geol. Surv. Canada, Rep. Progr. 1853–56, 1857, p. 275; Geol. Surv. Canada, dec. 4, 1859, p. 28, pl. 2, figs. 1a–1e.—Wetherby, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 153, pl. 5, figs. 2a–c.—Carpenter, Quart. Jour. Geol. Soc. London, 38, 1882, p. 298, fig. A; pl. 11, figs. 3–5.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 501, fig. 1812.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 18, pl. 5, figs. 1–5.

Trenton (Curdsville): Ottawa, Ontario; Woodford and Mercer Counties, Kentucky.

HYBOCYSTITES Bather. See *Hybocystites* Wetherby.

HYBOCYSTITES Wetherby.

Genotype: *H. problematicus* Wetherby.

Hybocystites Wetherby, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 150.—Carpenter, Quart. Jour. Geol. Soc. London, 38, 1882, p. 308.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, pp. 360, 373 (Rev. Pal., pp. 186, 199).—Miller, N. A. Geol. Pal., 1889, p. 256.—Zittel, Grundzüge Pal., 1910, p. 151.

Hybocystis Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 145.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 152.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, pp. 13–25; Zittel-Eastman Textb. Pal., 1, 1913, p. 211.

Hybocystites eldonensis (Parks).

Hybocystis eldonensis Parks, Ottawa Nat., 21, 1908, p. 234, pl. 2, fig. 4.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 13, pl. 2, figs. 1–10.

Trenton (Curdsville): Eldon township, Victoria County (near Kirkfield), Ontario. Observation.—Probably the same as *H. problematicus*.

Hybocystites problematicus Wetherby.

Hybocystites problematicus Wetherby, Jour. Cincinnati Soc. Nat. Hist., 3, 1880, p. 150, pl. 5, figs. 1a-c.—Carpenter, Quart. Jour. Geol. Soc. London, 38, 1882, p. 307, pl. 11, figs. 6-24.—Miller, N. A. Geol. Pal., 1889, p. 256, fig. 342.

Hybocystis problematicus Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 95, fig. 1.—Parks, The Ottawa Nat., 21, 1908, p. 232, pl. 2, figs. 1-3, 5.—Springer, Mem. Geol. Surv. Canada, 15P, 1911, p. 21 (under *H. eldonensis*); pl. 2, figs. 11, 12.

Trenton (Curdsville): Mercer and Woodford Counties, Kentucky; Kirkfield, Ontario.

HYDROLÆNUS CONIFRONS Salter. See *Illænus conifrons*.

HYOLITHELLUS Billings.

Genotype: *Hyolithes micans* Billings.

Hyolithellus Billings, Canadian Nat. Geol., n. s., 6, 1871, p. 240; Amer. Jour. Sci., 3d ser., 3, 1872, p. 360.—Walcott, Bull. U. S. Geol. Surv., 30, 1886, p. 141.—Miller, N. A. Geol. Pal., 1889, p. 391.—Matthew, Trans. Roy. Soc. Canada, 2d ser., 5, sec. 4, 1899, p. 107.

Hyolithellus papillatus Walcott.

Hyolithellus papillatus Walcott, Smiths. Misc. Coll., 57, 1912, p. 267, pl. 43, figs. 3, 4.

Upper Cambrian or Ozarkian (Potsdam): Marble River, near Chateaugay, Franklin County, New York.

Holotype.—Cat. No. 58553, U.S.N.M.

HYOLITHES Eichwald.

Genotype: *H. acutus* Eichwald.

Hyolithes Eichwald, Sil. Sch. Syst., Ehstland, 1840, p. 97.—Barrande, Syst. Sil. du Centre Boheme, 3, 1867, p. 55.—Billings, Canadian Nat., n. s., 6, 1871, p. 213.—Ford, Amer. Jour. Sci., 3d ser., 1, 1871, p. 472; 3, 1872, p. 352.—Kayser, Beitr. Geol. Pal. Argent. Repub., Pal. Suppl., 3, 1876, p. 8.—Hall, Pal. New York, 5, pt. 2, 1879, p. 191.—Waagen, Mem. Geol. Surv. India, Pal. Indica, 13th ser., 1, 1880, p. 175.—Zittel, Handb. Pal., 2, 1882, p. 316.—Koninck, Ann. d. Mus. Roy. d'Hist. Nat. de Belgique, 8, 1883, p. 223.—Matthew, Trans. Roy. Soc. Canada, 3, sec. 4, 1886, p. 45.—Walcott, Bull. U. S. Geol. Surv., 30, 1886, p. 131.—Remele, Zeits. d. d. geol. Gesell., 41, 1889, p. 762.—Miller, N. A. Geol. Pal., 1889, p. 391.—Matthew, Canadian Rec. Sci., 5, 1893, pp. 435-436, 437.—Holm, Sveriges Geol. Unders., ser. C, No. 112, 1893, p. 6, 9, 13, 45, 151.—Matthew, Canadian Rec. Sci., 5, 1893, p. 433.—Koken, Die Leitfossilien, Leipzig, 1896, p. 98, fig. 77; p. 400.—Matthew, Trans. Roy. Soc. Canada, 2d ser., 7, sec. 4, 1901, p. 93.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 950.

Hyolithes baconii Whitfield.

Hyolithes Baconi Whitfield, Ann. Rep. for 1877, Wisconsin Geol. Surv., 1878, p. 77; Geol. Wisconsin, 4, 1882, p. 225, pl. 6, figs. 9-11.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 158, fig.

Black River (Platteville): Beloit, etc., Wisconsin; Minnesota.

Hyolithes cliftonensis Foerste.

Hyolithes cliftonensis Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 62, pl. 3, figs. 38a, b.

Clinton (Osgood): Clifton, Tennessee.

Hyolithes(?) dubius Miller and Faber.

Hyolithes(?) dubius Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 155, pl. 8, fig. 23.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 964, pl. 42, fig. 3.

Richmond: Versailles, Indiana.

***Hyolithes gibbosus* Hall and Whitfield.**

Hyolithes gibbosus Hall and Whitfield, 23d Ann. Rep. New York State Cab. Nat. Hist., 1873, p. 242, pl. 11, figs. 1-3.—Walcott, *Smiths. Misc. Coll.*, 57, 1912, p. 265, pl. 43, figs. 5, 6.

Upper Cambrian or Ozarkian (Potsdam sandstone): Ausable Chasm, Essex County, New York.

***Hyolithes newsomensis* Foerste.**

Hyolithes newsomensis Foerste, *Jour. Geol.*, 11, 1903, p. 707; *Bull. Sci. Lab. Denison Univ.*, 14, 1909, p. 63, pl. 1, figs. 3A, B.

Niagaran (Waldron): Newsom, Swallow Bluff, and Iron City, Tennessee.

***Hyolithes parviusculus* (Hall).**

Theca parviuscula Hall, *Geol. Wisconsin*, 1862, p. 55, fig. 10.

Hyolithes parviusculus James, *Amer. Geol.*, 5, 1890, p. 355.

Richmond (Maquoketa): Wisconsin, Illinois, Iowa, and Missouri.

***Hyolithes pinniformis* Ruedemann.**

Hyolithes pinniformis Ruedemann, *Bull. New York State Mus.*, 162, 1912, p. 111, pl. 7, figs. 12, 13.

Trenton (Canajoharie): Canajoharie, New York.

***Hyolithes rhine* Ruedemann.**

Hyolithes rhine Ruedemann, *Bull. New York State Mus.*, 49, 1901, p. 36, pl. 2, figs. 12-15.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

***Hyolithes subimbricatus* Ringueberg.**

Hyolithes subimbricatus Ringueberg, *Proc. Acad. Nat. Sci. Philadelphia*, 1883, p. 135, pl. 7, fig. 7.

Clinton (Rochester): Lockport, New York.

***Hyolithes vanuxemi* Walcott.**

Hyolithes Vanuxemi Walcott, *Mon. U. S. Geol. Surv.*, 8, 1884, p. 85, pl. 11, figs. 16, 16a, b.

Lower Pogonip: Northeast of Adams Hill, Eureka District, Nevada.

Cotypes.—Cat. No. 17375, U.S.N.M.

***Hyolithes versaillesensis* Miller and Faber.**

Hyolithes versaillesensis Miller and Faber, *Jour. Cincinnati Soc. Nat. Hist.*, 17, 1894, p. 155, pl. 8, figs. 20-22.—Miller, *N. A. Geol. Pal.*, 2d App., 1897, p. 765, fig. 1409.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 965, pl. 42, figs. 4, 4a.

Richmond: Versailles, Indiana.

HYPANTHOCRINITES Phillips. See *Eucalyptocrinus Goldfuss*.

HYPANTHOCRINITES DECORUS Hall. See *Eucalyptocrinus cælatus lævis*.

HYPANTHOCRINUS Hall. See *Eucalyptocrinus Goldfuss*.

HYPANTHOCRINUS DECORUS Hall. See *Eucalyptocrinus cælatus lævis*.

***HYPSELOCONUS* Berkeley.**

Genotype: *Metoptoma recurva* Whitfield.

Hypseloconus Berkley, *Amer. Geol.*, 21, 1898, p. 282.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1909, p. 604.

***Hypseloconus recurvus* (Whitfield).**

Metoptoma recurva Whitfield, *Ann. Rep. for 1877, Wisconsin Geol. Surv.*, 1878, p. 61; *Geol. Wisconsin*, 4, 1882, p. 196, pl. 3, figs. 14, 15.—Chamberlin, *Geol. Wisconsin*, 1, 1883, p. 142, fig.

Hypseloconus recurvus—Continued.

Hypseloconus recurvus Berkey, Amer. Geol., 21, 1898, p. 284, pl. 19, figs. 3-8, 13-16, 27-31; pl. 21, figs. 8, 12, 13, 14, 16, 20.—Sardeson, Jour. Geol., 11, 1903, p. 479, fig. 6.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 604, fig. 804a, b.

Ozarkian (Mendota): East of Baraboo, Wisconsin.

HYPTIOCRINUS Wachsmuth and Springer. See *Cyphocrinus* Miller.

HYPTIOCRINUS *typus* Wachsmuth and Springer. See *Cyphocrinus* *gorbyi*.

HYSTRICURUS Raymond. Genotype: *Bathyrus conicus* Billings.

Hystericurus Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 60; Zittel-Eastman Textb. Pal., 1913, p. 716.

Hystericurus conicus (Billings).

Bathyrus conicus Billings, Canadian Nat. Geol., 4, 1859, p. 266, fig. 12d; Geol. Canada, Geol. Surv. Canada, 1863, p. 122, fig. 42; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 353, fig. 341.—Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 61, pl. 13, figs. 15-21.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 238.—Seely, Vermont State Geol. Rep., 7, 1910, pl. 57, figs. 4, 5.

Hystericurus conicus Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 60, pl. 7, fig. 9.

Canadian (Beekmantown): St. Timothy, on Beauharnois Canal, Canada; Comstock Landing, New York; Fort Cassin, Vermont; Cow Head, Newfoundland (Quebec-P).

Hystericurus cordai (Billings).

Bathyrus Cordai Billings, Canadian Nat. Geol., 5, 1860, p. 321, fig. 26; *ibid.*, 6, 1861, p. 314; Geol. Canada, Geol. Surv. Canada, 1863, p. 238, fig. 269; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 259, fig. 242; p. 412, fig. 395.

Bathyrus seelyi Whitfield, Bull. Amer. Mus. Nat. Hist., 11, 1889, p. 62, pl. 13, figs. 8-14.—Seely, Vermont State Geol., Rep. 7, 1910, pl. 57, figs. 6, 7.

Hystericurus cordai Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 61.

Canadian: Point Levis, Quebec (Levis conglomerates); Phillipsburg, Quebec (Beekmantown); Cow Head and Bay St. John, Newfoundland.

Hystericurus crotalifrons (Dwight).

Bathyrus (?) *crotalifrons* Dwight, Amer. Jour. Sci., 3d ser., 27, 1884, p. 253, pl. 7, figs. 4, 4a, 5, 6.

Hystericurus crotalifrons Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 61.

Canadian (Beekmantown): Rochdale, Dutchess County, New York.

Hystericurus? tuberculatus (Walcott).

Bathyrus? *tuberculatus* Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 91, pl. 12, fig. 9.

Upper Pogonip: Ridge southwest of Wood Cove, Eureka District, Nevada.

Cotype.—Cat. No. 24654, U.S.N.M.

ICHNOPHYCUS Hall.

Genotype: *I. tridactylus* Hall.

IchNOPhyCUS Hall, Pal. New York, 2, 1852, p. 26.—Miller, N. A. Geol. Pal., 1889, p. 120.

IchNOPhyCUS *tridactylus* Hall.

IchNOPhyCUS *tridactylus* Hall, Pal. New York, 2, 1852, p. 26, pl. 10, fig. 7a, b.—Miller, N. A. Geol. Pal., 1889, p. 120, fig. 41.

Clinton: New Hartford, New York.

ICHTHYOCRINUS Conrad.Genotype: *I. laevis* Conrad.

Ichthyocrinus Conrad, Jour. Acad. Nat. Sci. Philadelphia, 1842, 8, p. 279.—D'Orbigny, Prodr. de Pal., 1, 1849, p. 46.—Hall, Pal. New York, 2, 1852, pp. 195-355.—McCoy, British Pal. Rocks Foss., 1854, p. 54.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 319.—Hall, Rep. Geol. Surv. Iowa, 1, 1858, pt. 2, p. 557.—Beyrich, Ann. Mag. Nat. Hist., 4th ser., 7, 1871, p. 403.—Salter, Cat. Camb. and Sil. Foss., 1873, p. 126.—Angelin, Icon. Crinoid., 1878, p. 13.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1878, p. 252; *ibid.*, 1886, p. 67; *ibid.*, 1888, p. 353; *ibid.*, 1890, p. 387.—Zittel, Handb. Pal., 1, 1879, p. 355.—Miller, N. A. Geol. Pal., 1889, p. 256.—Bather, Nat. Sci., 12, 1898, p. 341.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 145, fig. 53.—Bather, Treatise on Zool., pt. 3, Echinodermata, London, 1900, p. 188, fig. 108.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 163.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 159; Bull. New York State Mus., 45, 1901, p. 159.—Springer, Jour. Geol., 14, 1906, p. 516.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 563.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 204.

***Ichthyocrinus? clintonensis* Hall.**

Ichthyocrinus? clintonensis Hall, Pal. New York, 2, 1852, p. 181, pl. A40, fig. 5. Lower Clinton: Reynales Basin, Niagara County, New York.

***Ichthyocrinus conoideus* Ringueberg.**

Ichthyocrinus conoideus Ringueberg, Ann. New York Acad. Sci., 5, 1890, p. 305, pl. 3, fig. 5.—Springer, Mon. Crin. Flex., Smith. Inst. (in press).
Niagaran (Lockport-Gasport member): Lockport, New York.

***Ichthyocrinus corbis* Winchell and Marcy.**

Ichthyocrinus corbis Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 89, fig.—Miller, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 175, pl. 4, fig. 5; N. A. Geol. Pal., 1889, p. 256, fig. 343.
Niagaran (Racine): Chicago and Cicero, Illinois.

***Ichthyocrinus laevis* Conrad.**

Ichthyocrinus laevis Conrad, Jour. Acad. Nat. Sci. Philadelphia, 8, 1842, p. 279, pl. 15, fig. 16.—Hall, Pal. New York, 2, 1852, p. 195, pl. 43, figs. 2a-p.—Billings, Canadian Nat. Geol., 1, 1856, p. 59, pl. fig. 4.—Pictet, Traité de Pal., 2d ed., 4, 1857, p. 319, pl. 100, fig. 17.—Emmons, Man. Geol., 1860, p. 119, fig. 100.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 7, fig. 3.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 258.—Miller, N. A. Geol. Pal., 1889, p. 256, fig. 344.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 159, fig. 54; Bull. New York State Mus., 45, 1901, p. 159, fig. 54.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 564, fig. 1900.
Cyathocrinites pyriformis Hall, Nat. Hist. New York Geol., 4, 1843, p. 11, fig. 3; p. 112, tab. ill. 17, fig. 3.—Owen, Amer. Jour. Sci. Arts, 48, 1845, p. 314, fig. 3.
Cyathocrinus pyriformis Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 167, figs.

Lecanocrinus simplex Hall, Pal. New York, 2, 1852, p. 202, pl. 46, figs. 2a-a.
Ichthyocrinus simplex Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879 (Rev. Pal., 1, 1879, p. 35).
Clinton (Rochester): Lockport, Rochester, etc., New York; Ontario.

ICHTHYOCRINUS SIMPLEX Wachsmuth and Springer. See *Ichthyocrinus laevis*.***Ichthyocrinus subangularis* Hall.**

Ichthyocrinus subangularis Hall, Trans. Albany Inst., 4, 1863, p. 201 (abstract, p. 7); 20th Rep. New York State Cab. Nat. Hist. (extras, 1865), p. 325, pl.

Ichthyocrinus subangularis—Continued.

11 (2), figs. 15, 16; p. 385, fig. 11; p. 391; rev. ed., 1870, p. 367, pl. 11, figs. 15, 16; p. 429, text fig; 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, 1877, pl. 16, figs. 11–13; mus. ed., 1879, p. 137, pl. 16, figs. 11–13; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 268, pl. 15, figs. 12, 13; pl. 16, figs. 11–13.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, p. 146, pl. 15, figs. 3–5.—Springer, Jour. Geol., 14, 1906, p. 477, pl. 6, fig. 2; Mon. Crin. Flex., Smith. Inst. (in press).

Niagaran: Waldron, Indiana (Waldron); Bridgeport and Romeo, Illinois (Racine).

IDIOCINUS Wachsmuth and Springer. See *Gazacrinus* Miller.

IDIOCINUS ELONGATUS Wachsmuth and Springer. See *Gazacrinus inornatus*.

IDIOCINUS TENNESSEENSIS Wachsmuth and Springer. See *Ormocrinus tennesseensis*.

IDIOSTROMA Winchell.

Genotype: *I. caespitosum* Winchell.

Idiostroma Winchell, Proc. Amer. Assoc. Adv. Sci., 15, 1867, p. 99.—Nicholson, Mon. British Ström., Pal. Soc., 1886, pp. 10, 11, 99.

Idiostroma nattressi Grabau.

Idiostroma nattressi Grabau, Michigan Geol. Surv., Geol., 1st ser., 1909, p. 94, pl. 9, figs. 5–7; pl. 8, figs. 2, 3.

Upper Monroan (Anderdon and Amherstburg): Near Amherstburg, Ontario.

IDIOTRYPA Ulrich.

Genotype: *Idiotrypa parasitica* Ulrich.

Idiotrypa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 272.—Miller, N. A. Geol. Pal., 1889, p. 310.—Ulrich, Geol. Surv. Illinois, 8, 1890, p. 375.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 591.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 34.—Bassler, *ibid.*, 292, 1906, p. 39.

IDIOTRYPA PARASITICA Ulrich. See *Idiotrypa punctata*.

Idiotrypa punctata (Hall).

Trematopora?? *punctata* Hall, Pal. New York, 2, 1852, p. 151, pl. 40A, figs. 4a–c.

Idiotrypa punctata Bassler, Bull. U. S. Geol. Surv., 292, 1906, p. 40, pl. 17, figs. 4–10; pl. 24, figs. 17–19.

Idiotrypa parasitica Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 273, pl. 13, figs. 1–1c.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, figs. 187–189 (p. 591).

Clinton: Rochester, Lockport, etc., New York (Rochester); Osgood, Indiana (Osgood).

Pteriotypes.—Cat. Nos. 35496, 43674, U.S.N.M. (Holotype of *I. parasitica*).

ILIONIA Billings.

Genotype: *I. canadensis* Billings.

Ilionia Billings, Canadian Nat., n. s., 7, 1874, p. 301.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 13.—Miller, N. A. Geol. Pal., 1889, p. 483.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 379.

Ilionia canadensis Billings.

Ilionia Canadensis Billings, Canadian Nat., n. s., 7, 1874, p. 301, fig. 1, 2.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 13, fig. 3; p. 14, fig. 4; *ibid.*, pt. 2, 1905, p. 67.

Silurian: Port Daniel, Bay of Chaleurs, Quebec; Elora and Hespeler, Ontario (Guelph).

***Ilionia? costulata* Whiteaves.**

Ilionia(?) *costulata* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 15, pl. 2, fig. 5; *ibid.*, pt. 2, 1895, p. 68 (loc. occ.).
Niagaran (Guelph): Elora and Durham, Ontario.

***ILIONIA GALTENSIS* Whiteaves.** See *ProLucina galtensis*.

***Ilionia? parvula* Whiteaves.**

Ilionia(?) *parvula* Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 238, pl. 28, figs. 6-8.
Niagaran: Ami Island near northeast shore of Lake Winnipegosis, Manitoba.

***Ilionia sinuata* (Hall).**

Anatina? *sinuata* Hall, Pal. New York, 3, 1859, p. 265, pl. 49, figs. 3a-3d.
Ilionia sinuata Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 15.—Schuchert, Amer. Geol., 31, 1903, p. 168.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 379.
Cayugan (Cobleskill and Manlius): Litchfield and Winfield, Herkimer County, New York.

***ILLENOIDES* Weller.**

Genotype: *I. triloba* Weller.

Illænoides Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 226.

***Illænoides triloba* Weller.**

Illænoides triloba Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 226, pl. 17, figs. 6-9; pl. 19, figs. 12-14.
Niagaran (Racine): Bridgeport, Joliet, and near Lemont, Illinois.

***ILLENURUS* Hall.**

Genotype: *I. quadratus* Hall.

Illænurus Hall, 16th Ann. Rep. New York State Cab. Nat. Hist., 1863, p. 176; Trans. Albany Inst., 5, 1867, p. 167.—Zittel, Handb. Pal., 2, 1885, p. 612.—Miller, N. A. Geol. Pal., 1889, p. 550.

***ILLENURUS COLUMBIANA* Weller.** See *Smyphysurus convexus*.

***Illænurus convexus* Whitfield.**

Illænurus convexus Whitfield, Ann. Rep. for 1877, Wisconsin Geol. Surv., 1878, p. 66; Geol. Wisconsin, 4, 1882, p. 203, pl. 4, figs. 3-5.—Chamberlin, *ibid.*, 1, 1883, p. 141, fig.
Ozarkian (Mendota): East of Baraboo, Wisconsin.

***ILLENURUS EUREKENSIS* Walcott.** See *Symphysurus eurekaensis*.

***ILLENUS* Dalman.**

Genotype: *Entomostracites crassicauda* Wahlenberg.

Illæus Dalman, Svenska Vet.-Akad. Handl., 1826, 1827, p. 248.—Dalman-Engelhart, Die Palaeaden, Nurnberg, 1828, p. 50.—Green, Mon. Tril. N. A., 1832, p. 18.—Portlock, Rep. Geol. Londonderry, 1843, p. 299.—Burmeister, Org. der Tril., Berlin, 1843, p. 118.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, pp. 541, 553.—Emmrich, Neues Jahrb. f. Min., etc., 1845, p. 41.—Rouault, Bull. Soc. Geol. France, 2d ser., 4, 1847, p. 318.—Hawley and Corda, Abh. d. k. böhmischen Gesell. d. Wiss., 5, 1847 (extract), p. 54, pl. 3, fig. 29.—McCoy, Ann. Mag. Nat. Hist. (2), 4, 1849, p. 399.—Salter, Mem. Geol. Surv. United Kingdom, dec. 2, 1849, pls. 3, 4.—Barrande, Neues Jahrb. f. Min., etc., 1850, p. 779; Syst. Sil. du Centre Bohème, 1, 1852, p. 669.—McCoy, British Pal. Rocks Fossils, 1854, p. 171.—Angelin, Pal. Scandinavica, 3d ed., Helmsä, 1854, p. 41.—Pictet, Traité de Pal., 2d ed., 2, 1854, p. 514.—Nieszkowski, Archiv. f. Naturk. Liv-, Ehst- u. Kurl. (1), 1, 1857, p. 579.—Hitchcock, Geol. Vermont, 1, 1862, p. 280.—Volborth, Mem. l'Acad. Imp. Sci. St. Péters-

ILLÆNUS—Continued.

burg, 7th ser., 6, 1863, p. 2.—Chapman, Canadian Jour. n. s., 8, 1863, p. 30.—Expos. Min., Geol., Canada, 1864, p. 138.—Salter, Mon. British Tril., Pal. Soc., 1867, pp. 180, 182.—Malaise, Desc. Terr. Sil. du Centre de la Belgique, 1873, p. 85.—Steinhardt, Beit. z. Naturk. Preuss. Phys.-Oekon. Gesell., Königsberg, 1874, p. 40.—Holm, Bihang K. Svenska Vet.-Handl., 7, 1882, pp. 12, 15.—Zittel, Handbuch d. Pal., 2, 1885, pp. 610, 611.—Holm, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 33, 1886, pp. 18, 20, 42.—Clarke, Jour. Morph., 2, 1888, pp. 254, 264.—Miller, N. A. Geol. Pal., 1889, p. 550. Koken, Die Leitfossilien, Leipzig, 1896, p. 28, fig. 17, figs. 1-3.—Beecher, Amer. Jour. Sci., 4th ser., 3, 1897, p. 104, pl. 3, fig. 19.—Reed, Geol. Mag., dec. 4, 1, 1898, p. 499.—Beecher, Zittel-Eastman Textb. Pal., 1, 1900, p. 630.—Grabau, Bull. New York State Mus. 45, 1901, p. 222.—Jaekel, Zeits. d. d. geol. Gesell., 53, 1901, p. 149.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 222.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 34, 1901, pp. 25, 26, 57.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 292.—Raymond, Zittel-Eastman Textb. Pal., 1913, p. 719.

Illænus aboynensis Whiteaves.

Illænus aboynensis Whiteaves, Geol. Surv. Can., Pal. Foss., 3, pt. 2, 1895, p. 108, pl. 15, figs. 7-8.

Niagara (Guelph): Aboyne, Ontario.

Illænus ambiguus Foerste.

Illænus ambiguus Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 106, pl. 14, figs. 9a, 9b, 10a-10c, 11; 15th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1887, p. 480, fig. 3, p. 478; Bull. Sci. Lab. Denison Univ., 2, 1887, p. 94; Proc. Boston Soc. Nat. Hist., 24, 1889, p. 267; Geol. Surv. Ohio, 7, 1893, p. 525, pl. 26, 9a-9b, 10a-10c, 11.

Upper Medina (Brassfield): Dayton, Ohio; Hanover, Indiana.

Illænus americanus (Billings).

Illænus crassicauda Hall (not Wahlenberg), Pal. New York, 1, 1847, p. 24, pl. 4 (bis), fig. 13.—Marcou, Geol. Map U. S., Boston, 1853, p. 22, pl. 1, fig. 2.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 215, pl. 18, fig. 5; pl. 15, fig. 15; pl. 3, fig. 13; Manual Geol., 1860, p. 100, fig. 89.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 3, fig. 9.—Hitchcock, Geol. Vermont, 1, 1862, p. 280.—Chapman, Canadian Jour., n. s., 8, 1863, p. 30, fig. 143; p. 201, fig. 196a; Expos. Min., Geol. Canada, 1864, p. 138, fig. 143; p. 173, fig. 196a.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 322, pl. 3, fig. 1a, b.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 160, fig.—Brainerd and Seely, Bull. Amer. Mus. Nat. Hist., 3, 1890, p. 22.—Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 716.

Illænus americanus Billings, Canadian Nat. Geol., 4, 1859, p. 371; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 329, fig. 316a-d, 318.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 714, figs. 20-23.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 234.—Ruedemann, Bull. New York State Mus., 49, 1901, p. 61.—Raymond and Narraway, Ann. Carnegie Mus., 4, nos. 3, 4, 1908, pl. 60, figs. 1-3.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 295, fig. 1604.

Illænus taurus Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 49.—Meek and Worthen; Geol. Surv. Illinois, 3, 1868, p. 320, pl. 3, fig. 2.—Miller, N. A. Geol. Pal., 1889, p. 551, fig. 1017.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1896, p. 73, pl. 12, figs. 4-9.—Rowley, Missouri Bur. Geol. and Mines, 2d ser., 8; 1908, p. 57, pl. 15, fig. 1.

Trenton: Ottawa, L'Original, etc., Canada; New York; Illinois; Wisconsin, Minnesota; etc.

***Illænus angusticollis* Billings.**

Illænus angusticollis Billings, Canadian Nat. Geol., 4, 1859, p. 376, fig. 10; Geol. Canada, Geol. Surv. Canada, 1863, p. 151, fig. 113a-d.—Raymond and Narraway, Ann. Carnegie Mus., 4, 1908, p. 245, pl. 61, figs. 1-5.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 294.

Black River: Island of St. Joseph, Grants Island, Lake Huron; La Petite Chaudière, Hull, Canada.

ILLÆNUS ARCTURUS Hall. See *Thaleops arcturus*.

***Illænus arcuatus* Billings.**

Illænus arcuatus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 279, fig. 265. Chazyan (Quebec-P): Cow Head, Newfoundland.

***Illænus argentinus* Kayser.**

Illænus argentinus Kayser, Zeits. d. d. geol. Gesell., 49, 1897, p. 283, pl. 7, figs. 8, 9.

Ordovician: East of Jachal, San Juan, Argentina.

ILLÆNUS ARMATUS Hall. See *Bumastus armatus*.

ILLÆNUS (BUMASTUS) BARRIENSIS Hall. See *Bumastus ioxus*.

***Illænus bayfieldi* Billings.**

Illænus Bayfieldi Billings, Canadian Nat. Geol., 4, 1859, p. 369, figs. 4-6; Geol. Canada, Geol. Surv. Canada, 1863, p. 133, fig. 65a-c.—Raymond, Ann. Carnegie Mus., 3, 1905, p. 348, pl. 13, figs. 11, 12; 7th Rep. Vermont State Geol., 1910, pl. 35, figs. 11, 12.

Chazyan (Mingan): Mingan Islands, Canada.

ILLÆNUS CHICAGOENSIS Weller. See *Bumastus chicagoensis*.

ILLÆNUS CLAVIFRONS Billings. See *Thaleops clavifrons*.

***Illænus confrons* Billings.**

Illænus confrons Billings, Canadian Nat. Geol., 4, 1859, p. 378, fig. 11; Geol. Canada, Geol. Surv. Canada, 1863, p. 151, figs. 111a, b.

Hydrolænus confrons Salter, Mon. British Tril., Pal. Soc., 1867, p. 182 (gen. rel.). Chazyan (Mingan): Mingan Islands, Canada.

***Illænus conradi* Billings.**

Illænus Conradi Billings, Canadian Nat. Geol., 4, 1859, p. 372, figs. 7-9; Geol. Canada, Geol. Surv. Canada, 1863, p. 151, figs. 110a-c.—Vogdes, Occ. Papers California Acad. Sci., No. 4, 1893, p. 330.—Raymond and Narraway, Ann. Carnegie Mus., 4, 1908, p. 245, pl. 60, figs. 9, 10.

Black River (Leray): Falls of La Petite Chaudière, vicinity of Ottawa, Canada.

***Illænus consimilis* Billings.**

Illænus consimilis Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, pp. 277, 331, figs. 263a-c, 317, 318a.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 294, fig. 1604a.

Chazyan (Quebec—L, M, N): Point Rich and Table Head, Newfoundland.

***Illænus consobrinus* Billings.**

Illænus consobrinus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 280, figs. 266a, b; p. 332, footnote, figs. 320a-c.

Chazyan (Quebec—P): Cow Head, Newfoundland.

***Illænus cornigerus* Hall and Whitfield.**

Illænus cornigerus Hall and Whitfield, 24th Rep. New York State Mus. Nat. Hist., 1872, p. 186; 27th Rep. New York State Cab. Nat. Hist., 1875, pl. 13, figs. 20, 21.

Niagaran (Louisville?): Falls of the Ohio.

***ILLÆNUS CRASSICAUDA?* Hall (1847). See *Bumastus erastusi*.**

***ILLÆNUS CRASSICAUDA* of American authors. See *Illænus americanus*.**

***ILLÆNUS CRASSICAUDA AMERICANA* Billings. See *Illænus americanus*.**

***ILLÆNUS CUNICULUS* Hall. See *Bumastus cuniculus*.**

***Illænus danielsi* Miller and Gurley.**

Illænus danielsi Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 3, 1893, p. 76, pl. 7, figs. 3-5.

Niagaran: Bonfield, near Kankakee, Illinois.

***Illænus daytonensis* Hall and Whitfield.**

Illænus daytonensis Hall and Whitfield, Pal. Ohio, 2, 1875, p. 119, pl. 5, figs. 14-16.—Foerste, Bull. Sci. Lab. Denison Univ., 1, 1885, p. 104, pl. 14, figs. 4a-4b, 6, 7a-7c; Bull. Sci. Lab. Denison Univ., 2, 1887, p. 93, pl. 8, figs. 6-7; Geol. Surv. Ohio, 7, 1895, p. 525, pl. 26, figs. 4a-4b, 6, 7a-c; pl. 27, figs. 6, 10a; Proc. Boston Soc. Nat. Hist., 24, 1889, p. 268; Jour. Geol., 11, 1903, p. 706.

Upper Medinan (Brassfield): Dayton, Fair Haven, etc., Ohio.

***Illænus depressus* Foerste.**

Illænus depressus Foerste, Cincinnati Soc. Nat. Hist. Jour., 21, 1909, p. 33.

Clinton (West Union): Spring, Big Salt Lick Creek, and near Martins, Lewis County, Kentucky.

***ILLÆNUS ERASTUSI* Raymond. See *Bumastus erastusi*.**

***Illænus fraternus* Billings.**

Illænus fraternus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 276, figs. 262a, b.

Chazyan (Quebec—L, N, P): Point Rich, Table Head, and near Portland Creek, Newfoundland.

***ILLÆNUS GLOBOSUS* Billings. See *Bumastus globosus*.**

***ILLÆNUS GRAFTONENSIS* Weller. See *Bumastus graftonensis*.**

***Illænus grandis* Billings.**

Illænus grandis Billings, Canadian Nat. Geol., 4, 1859, p. 380; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, pp. 27, 60 (loc. ref.).

Anticostian (Bessie River—Chicotte): Charleton Point, Gamache Bay, and Southwest Point, Anticosti.

***ILLÆNUS HARRISI* Weller. See *Bumastus harrisi*.**

***ILLÆNUS HERRICKI* Foerste. See *Thaleops ovata*.**

***ILLÆNUS IMPERATOR* Hall. See *Bumastus imperator*.**

***Illænus incertus* Billings.**

Illænus incertus Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 332, fig. 319a, b.

Canadian (Beekmantown): Stanbridge, Quebec.

ILLENUS INDETERMINATUS Raymond. See *Bumastus limbatus*.

ILLENUS INDETERMINATUS Walcott. See *Bumastus indeterminatus*.

ILLENUS INSIGNIS Hall. See *Bumastus insignis*.

ILLENUS (BUMASTUS) INSIGNIS Meek. See *Illænus springfieldensis*.

ILLENUS IOXUS Chamberlin. See *Bumastus ioxus*.

Illænus latiaxiatus Raymond and Narraway.

Illænus latiaxiatus Raymond and Narraway, Ann. Carnegie Mus., 4, 1906, p. 243, pl. 60, figs. 4-8.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 296.

Black River: Tetreauville and Mechanicsville, near Ottawa, Canada; Pattersonville and Newport, New York.

Illænus latidorsatus Hall.

Illænus latidorsatus Hall, Pal. New York, 1, 1847, p. 230, pl. 60, figs. 6a, b. Trenton: Near Watertown, New York.

ILLENUS MADISONIANUS Whitfield. See *Bumastus niagarensis*.

ILLENUS MADISONIANUS var. *DEPRESSA* Foerste. See *Bumastus niagarensis*.

ILLENUS MADISONIANUS var. *ELONGATUS* Foerste. See *Bumastus niagarensis*.

ILLENUS MILLERI Billings. See *Bumastus milleri*.

ILLENUS (NILEUS) MINNESOTENSIS Foerste. See *Nileus vigilans*.

ILLENUS NIAGARENSIS Whitfield. See *Bumastus niagarensis*.

ILLENUS ORBICAUDA Billings. See *Bumastus orbicaudatus*.

ILLENUS ORBICAUDATUS Billings. See *Bumastus orbicaudatus*.

ILLENUS OVATUS Hall. See *Thaleops ovata*.

ILLENUS PTEROCEPHALUS Whitfield. See *Thaleops? pterocephalus*.

Illænus punctatus Raymond.

Illænus punctatus Raymond, Annals Carnegie Mus., 3, 1905, p. 347, pl. 13, fig. 19; 7th Rep. Vermont State Geol., 1910, p. 226, pl. 35, fig. 10.

Chazy (Crown Point, Valcour): Crown Point and Valcour Island, New York.

Illænus simulator Billings.

Illænus simulator Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 327, fig. 315a, b.

Canadian (Beekmantown): Stanbridge, Quebec.

Illænus springfieldensis Meek.

Illænus (Bumastus) insignis? Meek, Pal. Ohio, 1, 1873, p. 189, figs. A, B, pl. 15, figs. 5a, c.

Illænus springfieldensis Meek, Pal. Ohio, 1, 1873, p. 129.

Niagaran (Guelph): Springfield, Ohio.

ILLENUS TAURUS Hall. See *Illænus americanus*.

Illænus transversalis Weller.

Illænus transversalis Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 2, 1907, p. 224, pl. 16, figs. 7-9.

Niagaran (Racine): Bridgeport, Illinois.

ILLENUS TRENTONENSIS Emmons. See *Bumastus milleri*.

Illeenus tumidifrons Billings.

Illeenus tumidifrons Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 278, fig. 264a, b.

Chazyan (Quebec P.): Cow Head, Newfoundland.

ILLENUS VINDEX Billings. See *Thaleops vindex*.

ILLENUS (BUMASTUS) WORTHENANUS Meek and Worthen. See *Bumastus armatus*.

INACHUS PERVETUS Conrad. See *Euomphalus pervetus*.

INACHUS UNDATUS Emmons (part). See *Plectoceras? undatus*.

INACHUS UNDATUS Conrad (part). See *Plectoceras halli*.

INDIANOCRINUS Miller and Gurley. Genotype: *I. punctatus* Miller and Gurley.

Indianocrinus Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 7, 1895, p. 83.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 748.—Bather, Treatise on Zool. (Lankester), pt. 3, 1900, p. 145.

Indianocrinus punctatus Miller and Gurley.

Indianocrinus punctatus Miller and Gurley, Bull. Illinois State Mus. Nat. Hist., 7, 1895, p. 83, pl. 5, figs. 8–13.—Miller, N. A. Geol. Pal., 2d App., 1897, p. 748, fig. 1362.

Niagaran (Laurel): St. Paul, Indiana.

INOCAULIS Hall.

Genotype: *I. plumulosa* Hall.

Inocaulis Hall, Amer. Jour. Sci. Arts, 2d ser., 11, 1851, p. 401; Pal. New York, 2, 1852, p. 176; 20th Rep. New York State Cab. Hist., 1868, p. 218, rev. ed., 1870, p. 252.—Nicholson, Mon. British Grapt., 1872, p. 131.—Spencer, Bull. Mus. Univ. State Missouri, 1, 1884, p. 33; Trans. Acad. Sci. St. Louis, 4, 1884, p. 562, 583.—Miller, N. A. Geol. Pal., 1889, p. 193.—James, Jour. Cincinnati Soc. Nat. Hist., 14, pt. 2, 1892, p. 161.—Pocta, Syst. Sil. Centre Boheme, 8, pt. 1, 1894, p. 197.—Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. 34.—Ruedemann, Mem. New York State Mus., 2, 1908, p. 185.

INOCAULIS ANASTOMOTICA Ringueberg. See *Palseodictyota anastomotica*.

INOCAULIS ARBUSCULA Ulrich. See *Dictyonema arbusculum*.

INOCAULIS BELLA Hall and Whitfield. See *Palseodictyota bella*.

INOCAULIS CANADENSIS Whiteaves. See *Dictyonema canadense*.

Inocaulis cervicornis Spencer.

Inocaulis cervicornis Spencer, Canadian Nat., 10, 1882, p. 165, nom. nud.; Bull. Mus. Univ. State Missouri, 1, 1884, p. 37, pl. 5, fig. 5; Trans. Acad. Sci. St. Louis, 4, p. 587, pl. 5, fig. 5.—Gurley, Jour. Geol., 4, 1896, pp. 99, 308.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 51, fig. 65.

Niagaran dolomite: Hamilton, Ontario.

Inocaulis congregatus Gurley.

Inocaulis congregatus (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 54, fig. 70.

Niagaran dolomite: Hamilton, Ontario.

Inocaulis diffusus Spencer.

Inocaulis diffusa Spencer, Canadian Nat., 10, 1882, p. 165, nom. nud.; Bull. Mus. Univ. State Missouri, 1, pp. 15, 36, 37, pl. 5, fig. 4; Trans. Acad. Sci. St. Louis, 4, pp. 565, 586, 587, pl. 5, fig. 4.—Gurley, Jour. Geol., 4, 1896, pp. 99, 309.—Bäzler, Bull. U. S. Nat. Mus., 65, 1909, pp. 52, 53, figs. 67, 68.

Niagaran dolomite: Hamilton, Ontario.

Inocaulis diffusus crassiramus Gurley.

Inocaulis diffusus crassiramus (Gurley MS.) Bäzler, Bull. U. S. Nat. Mus., 65, 1909, pp. 53, 54, fig. 69.

Niagaran dolomite: Hamilton, Ontario.

Inocaulis divaricatus Hall.

Inocaulis divaricata Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 225, pl. 1, fig. 3; Trans. Albany Inst., 10, 1883, p. 58.—Spencer, Bull. Mus. Univ. State Missouri, 1, 1884, p. 35; Trans. Acad. Sci. St. Louis, 4, 1884, p. 585.—Gurley, Jour. Geol., 4, 1896, pp. 99, 309.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 191.

Niagaran (Waldron): Waldron, Indiana.

INOCAULIS FLABELLUM James. See *Licrophycus flabellum*.**Inocaulis grantii** (Dawson).

Buthotrephis Grantii Dawson, Quart. Jour. Geol. Soc. London, 46, 1890, p. 613, fig. 16; p. 614, fig. 17.

Inocaulis vegetabilis (Gurley MS.) Bäzler, Bull. U. S. Nat. Mus., 65, 1909, p. 55, pl. 5, fig. 1.

Niagaran dolomite: Hamilton, Ontario.

Inocaulis phycoides Spencer.

Inocaulis phycoides Spencer, Canadian Nat., 10, 1882, p. 165, nom. nud.; Bull. Mus. Univ. State Missouri, 1, 1884, p. 38, pl. 5, figs. 6, 7, 7a; Trans. Acad. Sci. St. Louis, 4, 1884, p. 588, pl. 5, figs. 6, 7.—Gurley, Jour. Geol., 4, 1896, pp. 99, 309.—Bäzler, Bull. U. S. Nat. Mus., 65, 1909, pp. 51, 52, fig. 66.

Niagaran dolomite: Hamilton, Ontario.

Inocaulis plumulosus Hall.

——— Hall, Rep. Surv. 4th Dist. New York, 1843, p. 116, fig. 1.

Inocaulis plumulosa Hall, Pal. New York, 2, 1852, p. 176, pl. 40G, figs. 2a, b; Geol. Surv. Canada, dec. 2, 1865, p. 18, fig. 26; 20th Rep. New York State Geol. Hist., 1868, p. 185, fig. 28; rev. ed., 1870, p. 215, fig. 28.—Nicholson, Mon. British Grapt., 1872, p. 132, fig. 73.—Spencer, Canadian Nat., 8, 1878, p. 456; *ibid.*, 10, 1882, p. 166.—Spencer, Bull. Mus. Univ. State Missouri, 1, 1884, pp. 14, 34, 35, pl. 5, fig. 1; Trans. Acad. Sci. St. Louis, 4, 1884, pp. 564, 584, 585, pl. 5, fig. 1.—Pocta, Sil. Syst. Bohemia, 8, pt. 1, 1894, p. 197.—Gurley, Jour. Geol., 4, 1896, pp. 99, 309.—Miller, N. A. Geol. Pal., 1889, p. 193, fig. 183.—Ruedemann, Mem. New York State Mus., 11, 1908, p. 188, pl. 2, fig. 4; pl. 7, figs. 1, 2, fig. 93.—Bäzler, Bull. U. S. Nat. Mus., 65, 1909, pp. 46–49, figs. 59–62.

Clinton (Rochester): Lockport, Rochester, etc., New York.

Niagaran dolomite: Hamilton, Ontario.

Pteriotypes.—Cat. No. 54281, U.S.N.M.

INOCAULIS? PROBLEMATICA Spencer. See *Dendrograptus? problematicus*.

Inocaulis ramulosus Spencer.

Inocaulis ramulosa Spencer, Canadian Nat., 10, 1882, p. 165, nom. nud.; Bull. Mus. Univ. State Missouri, 1, p. 38, 1884, pl. 6, fig. 1; Trans. Acad. Sci. St. Louis, 4, 1884, p. 588, pl. 6, fig. 1.—Gurley, Jour. Geol., 4, 1896, pp. 99, 309.—Bassler, Bull. U. S. Nat. Mus., 65, 1909, pp. 49, 50, figs. 63, 64.

Niagaran dolomite: Hamilton, Ontario.

Inocaulis? strictus Gurley.

Inocaulis? strictus (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 54, pl. 2, fig. 6; fig. 71.

Niagaran dolomite: Hamilton, Ontario.

Inocaulis? thallosus Gurley.

Inocaulis? thallosus (Gurley MS.) Bassler, Bull. U. S. Nat. Mus., 65, 1909, p. 55, pl. 2, fig. 5.

Niagaran dolomite: Hamilton, Ontario.

INOCAULIS VEGETABILIS (Gurley) Bassler. See *Inocaulis granti*.

INOCAULIS WALKERI Spencer. See *Acanthograptus walkeri*.

INTRICARIA Hall. See *Chasmatopora* Eichwald.

IOCRINUS Hall.

Genotype: *Actinocrinus subcrassus* Meek and Worthen.

Iocrinus Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 210 (extract 1866, p. 5).—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, pp. 285, 293 (Rev. Pal., pt. 1, pp. 62, 70); *ibid.*, 1886, p. 127; *ibid.*, 1890, p. 380; Amer. Jour. Sci., 3d ser., 26, 1883, pp. 370, 376, fig. 4.—Walcott, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 210.—Miller, N. A. Geol. Pal., 1889, p. 256, fig. 345.—Bather, Ann. Mag. Nat. Hist., 6th ser., 5, 1890, p. 324, pl. 14, fig. 5; pl. 15, fig. 2; Kongl. Sv. Vet. Akad. Handl., 25, 1893, p. 21; Geol. Mag., dec. 4, 3, 1896, p. 73; *ibid.*, dec. 4, 6, 1899, p. 42, footnote, fig. 18; Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 145, fig. 26, 1; 28; 58, 1.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 153.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 713.—Zittel, Handb. Pal., 1, 1910, p. 151.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 212.

Iocrinus crassus (Meek and Worthen).

Heterocrinus crassus Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 147; Geol. Surv. Illinois, 3, 1868, p. 324, pl. 4, figs. 1a-c; Geol. Surv. Illinois, 6, 1875, p. 493, pl. 23, fig. 1.

Iocrinus crassus Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 295 (Rev. Pal., pt. 1, p. 72) (gen. ref.).

Richmond (Maquoketa): Kendall County, Illinois.

Iocrinus subcrassus Meek and Worthen).

Actinocrinus subcrassus Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, (1), 17, 1865, p. 148.

Heterocrinus subcrassus Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 325, pl. 4, figs. 5a-d.—Dyche, Science, 20, 1892, p. 66; Amer. Geol., 10, 1892, p. 30; Jour. Cincinnati Soc. Nat. Hist., 15, 1892, p. 101.

Heterocrinus (*Iocrinus*) *subcrassus* Meek and Worthen, Proc. Acad. Nat. Sci. Philadelphia, (1), 1871, 23 (3), 1, p. 310; Geol. Surv. Ohio, 1, pt. 2, p. 15, pl. 1, figs. 9a, b.

Iocrinus subcrassus—Continued.

Iocrinus subcrassus Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1879, p. 295 (Rev. Pal., pt. 1, p. 72); *ibid.*, 1890, p. 381, pl. 10, fig. 5.—Bather, Geol. Mag., dec. 4, 6, 1899, p. 35, fig. 11.—Miller, N. A. Geol. Pal., 1889, p. 257, fig. 346; Treatise on Zool., pt. 3, Echinoderma, London, p. 120, fig. 26, 1.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1906, p. 728, pl. 4, figs. 7, 7a.

Heterocrinus? (*Iocrinus*) Polyxo Hall, 24th Rep. New York State Cab. Nat. Hist., 1872, p. 212, pl. 5, figs. 1-4 (extract, 1871).

Trenton-Richmond: Cincinnati, Ohio, and vicinity; Indiana; Kentucky.

Iocrinus trentonensis Walcott.

Iocrinus trentonensis Walcott, 35th Rep. New York State Mus. Nat. Hist., 1894, p. 210, pl. 17, figs. 7, 8.

Trenton: Trenton Falls, New York.

ISCHADITES Murchison.

Genotype: *Tetragonis murchisoni* Eichwald.

Ischadites Murchison, Siluria, 1837, p. 697.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 86.—Gumbel, Abh. d. Math.-Phys. Classe d. k. Bay. Akad. d. Wiss., 12, 1 Abth., 1875, p. 172.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1878, p. 19.—Zittel, Handb. Pal., 1, 1880, p. 728.—Roemer, Leth. Geog., 1, Theil, Leth. Pal., Erste Lief, 1880, p. 291.—Hinde, Quart. Jour. Geol. Soc. London, 11, 1884, p. 810.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 9, 1886, pp. 246, 249.—Schluter, Zeits. d. d. geol. Gesell., 39, 1887, p. 7.—Geinitz, *ibid.*, 40, 1888, p. 19.—Rauff, *ibid.*, 40, 1888, p. 606.—Hinde, Mon. British Foss. Sponges, Palaeontographical Soc., 1888, p. 119.—Rauff, Abh. d. math.-phys. Classe d. k. bayer. Akad. Wiss., 13, 3, Abth., 1892, p. 692.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 61, pl. F, figs. 5-10; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 72.

Palaeospongia D'Orbigny, Prodr. de Pal., 1, 1849, p. 26.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 540.—Bornemann, Nova Acta der Kal. Leop.-Carol. Deutschen Akad. der Natur., 51, 1886, p. 21.—Hinde, Geol. Mag., dec. 3, 4, 1887, p. 228.—Miller, N. A. Geol. Pal., 1889, p. 162.—Rauff, Neues Jahrb. f. Min., Geol. Pal., 2, 1891, p. 92. (Genotype, — *cyathiformis* Hall.)

Tetragonis Eichwald, Urwelt. Russlands, heft 2, 1842, p. 81.—Chapman, Canadian Jour., n. s., 2, 1857, p. 304.—Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 386.—Roemer, Leth. Geog., 1 Theil, Leth. Pal., Erste Lief, 1880, p. 303.—Zittel, Handb. Pal., 1, 1880, p. 728.—Roemer, Zeits. d. d. Gesell., 35, 1883, pp. 705, 707.

Selenoides Owen, Geol. Surv. Wisconsin, Iowa, and Minnesota, 1852, p. 586.

Dictyocrinus Hall, Pal. New York, 3, 1859, p. 135.

Receptaculites (part) Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 378.

Ischadites canadensis Billings.

Ischadites canadensis Billings, Geol. Canada, 1863, p. 309, fig. 313; p. 327.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, Pal., 1895 (ext., 1898), p. 66.

Receptaculites canadensis Billings, Pal. Foss., 1, 1865, p. 384, fig. 363; Canadian Nat. Geol., 2d ser., 2, 1865, p. 191, fig. 10.—Roemer, Leth. Pal., 1880, p. 289.—Hinde, Quart. Jour. Geol. Soc. London, 40, 1884, p. 844.

Niagaran (Lockport?): Township of Esquevas, Ontario.

Ischadites circularis (Emmons).

Receptaculites circularis Emmons, Amer. Geology, 1, pt. 2, 1855, p. 230, fig. 82; Man. Geol., 1860, p. 103, fig. 93.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 852, fig.—James, Jour. Cincinnati Soc. Nat. Hist., 14, p. 63, pt. 1.

Ischadites circularis—Continued.

Ischadites circularis Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 65.
Lorraine shales: New York.

Ischadites cyathiformis (Hall).

— *cyathiformis* Hall, Pal. New York, 1, 1847, p. 72, pl. 25, figs. 6a-6c.

Ischadites cyathiformis Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 65 (extr., 1893).

Palæospongia cyathiformis d'Orbigny, Prodr. d. Pal., 1, 1849, p. 26 (gen. ref.).

Palæochonia cyathiformis Fromental, Introduction Etude Eponges Foss., Caen., 1859, p. 45.

Mohawkian (Chambersburg): Carlisle, Pennsylvania.

ISCHADITES DICKHAUTI James. See *Lepidolites dickhauti*.

ISCHADITES ELONGATUS James. See *Lepidolites dickhauti*.

ISCHADITES HEMISPHERICUS Winchell and Marcy. See *Receptaculites hemisphericus*.

Ischadites insularis (Billings).

Receptaculites? insularis Billings, Cat. Silurian Foss. Anticosti, Geol. Surv. Canada, 1866, p. 29.—Hinde, Quart. Jour. Geol. Soc. London, 40, 1884, p. 846.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 61 (extr., 1893).

Gamachian (Ellis Bay): Gamache Bay, Anticosti.

Ischadites iowensis (Owen).

Selenoides iowensis Owen, Geol. Surv. Wisconsin, Iowa, Minnesota, 1852, p. 587, pl. 2B, fig. 13.

Receptaculites (Selenoides) iowensis Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 14.—Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 385, fig. 364.—Hall, 16th Ann. Rep. New York State Cab. Nat. Hist., 1863, pp. 68, 69.—Billings Canadian Nat. and Geol., 2d ser., 2, 1865, p. 191, fig. 11.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 852, fig.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 2, 1893, p. 64, pl. F, figs. 5-6.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 143.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 153.

Receptaculites (Ischadites) iowensis Grabau and Shimer, N. A. Index Fossils, 1, 1906, p. 19, fig. 30.

Orbitulites reticulata Owen, Geol. Rep. Iowa, Wisconsin, Illinois, 1844, pl. 18, fig. 7.

Receptaculites reticulata Hall, Rep. Supt. Geol. Surv. Wisconsin, 1861, p. 11 (gen. ref.).

Receptaculites fungosum Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 15.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 45, pl. 5, figs. 5, 6.

Receptaculites globulare Hall, Rep. Geol. Surv. Wisconsin, 1861, p. 16.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 301, pl. 2, figs. 2a-b.—Whitfield, Mem. Amer. Mus. Nat. Hist., 1, pt. 2, 1895, p. 44, pl. 5, fig. 7.

Receptaculites sp. Meek and Worthen, Geol. Surv. Illinois, 3, 1868, pt. 3, p. 301, pl. 2, figs. 1a, b.

Ischadites kœnigii (part) Hinde, Quart. Jour. Geol. Soc. London, 40, 1884, p. 836.
Trenton (Prosser-Galena): Iowa; Illinois; Wisconsin; Minnesota and Manitoba.

ISCHADITES KœNIGII Hinde (part). See *Ischadites iowensis* and *I. subturbinatus*.

Ischadites subturbيناتus Hall.

Receptaculites subturbيناتus Hall, Trans. Albany Inst., 4, 1863, p. 224; 25th Rep. New York State Mus. Nat. Hist., 1879, p. 103, pl. 3, figs. 1-3 (doc. ed., 1875 (1877), pl. 3, figs. 1-3); 11th Rep. State Geol. Indiana, 1882, p. 221, pl. 2, figs. 1-3.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 855, text figs. *Ischadites subturbيناتus* Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1896 (ext., 1893), p. 66.

Ischadites koenigii (part) Hinde, Quart. Jour. Geol. Soc. London, 40, 1884, p. 834. Niagaran (Waldron): Waldron, Indiana.

ISCHADITES TESSELATUS Winchell and Marcy. See *Receptaculites tessellatus*.

ISCHYRINIA Billings.

Genotype: *I. winchelli* Billings.

Ischyria Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 16.—Miller, N. A. Geol. Pal., 1889, p. 483.

Ischyria Clarke, Mem. New York State Mus., 6, 1904, p. 406, expl. pl. 9.

Observation.—Probably the same as *Technophorus*.

ISCHYRINIA PLICATA Billings. See *Technophorus plicata*.

Ischyria winchelli Billings.

Ischyria winchelli Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 16, figs. 4a-4c.—Miller, N. A. Geol. Pal., 1889, p. 483, fig. 834.

Richmond (English Head and Charleton): Macasty Bay, Anticosti.

Platotype.—Cat. No. 46204, U.S.N.M.

ISCHYRODONTA Ulrich.

Genotype: *I. truncata* Ulrich.

Anodontopsis (part) Meek, Amer. Jour. Sci. Arts, 3d ser., 2, 1871, p. 209; also 1873, Ohio Pal., 1, p. 141.

Ischyrodonta Ulrich, Amer. Geol., 6, 1890, p. 173; Geol. Surv. Ohio., 7, 1893, p. 671.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 981.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 416.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 700.

ISCHYRODONTA CURTA Foerste. See *Ischyrodonta unionoides*.

Ischyrodonta decipiens Ulrich.

Ischyrodonta decipiens Ulrich, Geol. Surv. Ohio, 7, 1893, p. 673, pl. 54, figs. 16-19.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 999, pl. 45, figs. 3-3c.

Richmond (Elkhorn): Near Richmond, Indiana.

Cotypes.—Cat. Nos. 46205, 46206, U.S.N.M.

Ischyrodonta elongata Ulrich.

Ischyrodonta elongata Ulrich, Amer. Geol., 6, 1890, p. 175, figs. 12a-c; Geol. Surv. Ohio, 7, 1893, p. 675, pl. 54, figs. 20, 21.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1000, pl. 45, figs. 4, 4a.

Richmond (Whitewater): Oxford, Ohio; Richmond, Indiana.

Holotype and *paratype*.—Cat. Nos. 46207, 46208, U.S.N.M.

Ischyrodonta miseneri Ulrich.

Ischyrodonta miseneri Ulrich, Rep. Geol. Surv. Ohio, 7, 1893, p. 675, pl. 54, figs. 10, 11.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1001, pl. 45, figs. 5, 5a.

Cypricardites miseneri Miller, N. A. Geol. Pal., 2d App., 1897, p. 781 (gen. rel.). Richmond (Whitewater): Richmond, Indiana.

Holotype.—Cat. No. 46209, U.S.N.M.

***Ischyrodonta modioliformis* Ulrich.**

Ischyrodonta modioliformis Ulrich, Geol. Surv. Ohio, 7, 1893, p. 676, pl. 54, figs. 4-9.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1001, pl. 45, figs. 6, 6e.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 416, fig. 539.

Richmond (Whitewater): Richmond, Indiana.

Cotypes.—Cat. No. 46210, U.S.N.M.

***Ischyrodonta ovalis* Ulrich.**

Ischyrodonta ovalis Ulrich, 19th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1892, p. 242, fig. 27; Geol. Surv. Ohio, 7, 1893, p. 674, pl. 54, figs. 12-15; Geol. Minnesota, 3, pt. 2, 1894, p. 477, fig. 35.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1002, pl. 45, figs. 7-7b.

Cypricardites ovalis Miller, N. A. Geol. Pal., 2d App., 1897, p. 781 (gen. ref.).

Richmond (Whitewater): Near Richmond, Indiana.

Holotype.—Cat. No. 46211, U.S.N.M.

***Ischyrodonta truncata* Ulrich.**

Ischyrodonta truncata Ulrich, Amer. Geol., 6, 1890, p. 174, fig. 11.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 700, fig. 1258.—Ulrich, Geol. Surv. Ohio, 7, 1893, p. 672, fig. 1.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1003, pl. 45, figs. 8-8c.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 416, fig. 540.

Richmond (Whitewater): Oxford, Ohio, and Richmond, Indiana.

Cotypes.—Cat. No. 46212, U.S.N.M.

***Ischyrodonta unionoides* (Meek).**

Anodontopsis? unionoides Meek, Amer. Jour. Sci. Arts, 2, 1871, p. 299.

Anodontopsis (Modiolopsis?) unionoides Meek, Pal. Ohio, 1, 1873, p. 141, pl. 12, figs. 2a, b.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 227.

Modiolopsis unionoides Miller, N. Amer. Geol. Pal., 1890, p. 491 (gen. ref.).

Ischyrodonta unionoides Ulrich, Geol. Surv. Ohio, 7, 1893, p. 677, pl. 54, figs. 1-3.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1004, pl. 46, figs. 1, 1a.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 416, fig. 538.

Ischyrodonta curta Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 298, pl. 3, fig. 14.

Maysville (Bellevue): Cincinnati, Ohio, and vicinity. Pulaaki shales of New York and Canada.

Plesiotypes.—Cat. No. 46213, U.S.N.M.

ISOARCA LOGANI Woodward. See *Ctenodonta nasuta*.

ISOCHILINA Jones.

Genotype: *Leperditia ottawa* Jones.

Isochilina Jones, Geol. Surv. Canada, dec. 3, 1858, p. 97; Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 248; Monthly Microsc. Jour., 4, 1870, p. 191.—Barrande, Syst. Sil. du Centre Boheme, 1, Suppl., 1872, p. 533.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 7th ser., 21, No. 2, 1873, p. 8.—Zittel, Handb. Pal., 2, 1885, p. 552.—Vogdes, Annals New York Acad. Sci., 5, 1889, p. 22, pl. 2, fig. 18.—Miller, N. A. Geol. Pal., 1889, p. 551.—Koken, Die Leitfossilien, Leipzig, 1896, p. 40.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 307.—Ulrich, Zittel-Eastman Textb. Pal., 1, 1900, p. 643.—Grabau, Bull. New York State Mus., 45, 1901, p. 218; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 218.—Jaekel, Zeits. geol. Gesell., 53, 1901, p. 149.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 341.—Basler, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 737.

ISOCHILINA AMIANA Ulrich. See *Isochilia gregaria*.

ISOCHILINA AMIANA var. *INSIGNIS* Ulrich. See *Isochilina cristata*.

Isochilina amii Jones.

Isochilina Amii Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 68, pl. 10, figs. 14a, -b.

Trenton: Lorette, Quebec.

Isochilina ampla Ulrich.

Isochilina ampla Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1891, p. 179, pl. 11, figs. 8a-d.

Trenton (Catheys): Nashville, Tennessee.

Cotypes.—Cat. No. 41291, U.S.N.M.

Isochilina armata (Walcott).

Leperditia (*Isochilina*) *armata* Walcott, 35th Rep. New York State Mus. Nat. Hist., 1884, p. 213, pl. 17, fig. 10 (extract, 1883, p. 7).

Isochilina kentuckiensis Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 179, pl. 11, figs. 11a-11d.

Black River (Lowville): Russia, Herkimer County, New York; High Bridge and Frankfort, Kentucky.

Plesiotype.—Cat. No. 43155, U.S.N.M. (Holotype of *I. kentuckiensis*.)

Isochilina armata pygmaea Ruedemann.

Isochilina armata pygmaea Ruedemann, Bull. New York State Mus., 49, 1901, p. 72, pl. 7, figs. 19-25.

Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

Isochilina? clavigera (Jones).

Beyrichia clavigera Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, p. 65, pl. 11, fig. 7.

Isochilina? clavigera Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 282, fig. 3.

Stones River (Pamelia): Aylmer, Quebec.

Plesiotype.—Cat. No. 41653, U.S.N.M.

Isochilina clavigera clavifracta (Jones).

Beyrichia clavigera clavifracta Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, p. 65, pl. 11, fig. 8.

Stones River (Pamelia): Aylmer, Quebec.

Isochilina cristata (Whitfield).

Primitia? cristata Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 59, pl. 13, figs. 1, 2.—Lesley, Geol. Surv. Pennsylvania Rep. P 4, 1889, p. 743, figs.

Isochilina cristata Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 23, pl. 1, fig. 8.—Seely, Vermont State Geol., Rep., 7, 1910, pl. 61, fig. 15.

Isochilina amiana var. *insignis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1891, p. 181, pl. 11, fig. 13.

Canadian (Beekmantown): Cave Island, Ball's Bay, Lake Champlain; drift at Ottawa, Ontario.

Plesiotype.—Cat. No. 41290, U.S.N.M. (Holotype of *I. amiana insignis*.)

ISOCHILINA CYLINDRICA Grabau. See *Leperditia cylindrica*.

Isochilina gracilis (Jones).

Leperditia (*Isochilina*) *gracilis* Jones, Ann. Mag. Nat. Hist. (3), 1, 1858, p. 248, pl. 10, fig. 2; Geol. Surv. Canada, dec. 13, 1858, p. 98, pl. 11, fig. 15.

***Isochilina gracilis*—Continued.**

Isochilina gracilis Jones, Monthly Micros. Jour., 4, 1870, p. 185, pl. 61, fig. 18.—Dwight, Trans. Vassar Bros. Inst., 5, 1890, p. 76.

Trenton or Black River: White Horse Rapids, Isle Jesus, Canada.

***ISOCHILINA GRANDIS* Jones.** See *Isochilina grandis latimarginata*.

***Isochilina grandis latimarginata* (Jones).**

Leperditia marginata? Jones (not Keyserling), Ann. Mag. Nat. Hist., 2d ser., 17, 1856, p. 94, 100, pl. 7, figs. 14a-d.

Isochilina grandis Jones (not Schrenk), Ann. Mag. Nat. Hist., 5th ser., 8, 1881, p. 347; *ibid.*, 9, 1882, p. 171.

Isochilina grandis var. *latimarginata* Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 78, pl. 10, figs. 1-4.

Niagaran: Long Point, Lake Winnipegosis, Cedar Lake, and Saskatchewan River, Canada.

***Isochilina gregaria* (Whitfield).**

Primitia gregaria Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 58, pl. 13, figs. 3-5.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 743, figs.

Isochilina gregaria Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 22, pl. 1, figs. 9, 10.—Seely, Vermont State Geol. Rep., 7, 1910, pl. 61, figs. 16, 17.

Isochilina ottawa Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 551.

Isochilina Ottawa var. *intermedia* Jones, Contr. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 66, pl. 10, figs. 10a, b, 11a, b.

Isochilina amiana Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1891, p. 180, pl. 11, figs. 12a-c.

Canadian (Beekmantown): Cave Island, Ball's Bay, Vermont; drift at Ottawa, Ontario.

Plesiotype.—Cat. No. 41289, U.S.N.M. (Holotype of *I. amiana*.)

***Isochilina gregaria ulrichiana* Jones.**

Isochilina gregaria ulrichiana Jones, Geol. Mag., dec. 4, 10, 1903, p. 301, figs. 1, 2a, b.

Trenton(?): Hamilton, Ontario (drift).

***Isochilina jonesi* Wetherby.**

Isochilina jonesi Wetherby, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 80, pl. 2, figs. 7, 7a.—Miller, N. A. Geol. Pal., p. 552, fig. 1018.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, pt. 1, 1891, p. 179, pl. 11, figs. 9a-c.—Grabau and

Shimer, N. A. Index Fossils, 2, 1910, p. 342, figs. 1656l-n.

Trenton (Perryville): Mercer County, Kentucky.

***ISOCHILINA KENTUCKIENSIS* Ulrich.** See *Isochilina armata*.

***ISOCHILINA LABELLOSA* Jones.** See *Leperditella? labellosa*.

***Isochilina labrosa* Jones.**

Isochilina labrosa Jones, Ann. Mag. Nat. Hist., 6th ser., 3, 1889, p. 383, figs. 3, 4; pl. 17, fig. 11.—Chapman, Proc. Roy. Soc. Victoria, n. s., 17, pt. 1, 1904, p. 299, pl. 16, fig. 3.

Silurian: Cap Bon Ami, New Brunswick; ?Cave Hill, Lilydale, Victoria.

***Isochilina musculosa* Foerste.**

Isochilina musculosa Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 30, pl. 1, fig. 2.

Cayugan (Kokomo): Kokomo, Indiana.

***Isochilina ottawa* (Jones).**

- Leperditia* (*Isochilina*) *Ottawa* Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 243, pl. 10, fig. 1; Geol. Surv. Canada, dec. 3, 1858, p. 97, pl. 11, fig. 14.
Isochilina ottawa Jones, Ann. Mag. Nat. Hist., 5th ser., 14, 1884, p. 345; Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 66.
Leperditia Ottawa Dwight, Vassar Bros. Inst., 5, 1890, p. 76.
 Canadian (Beekmantown): Grenville, Quebec.

***ISOCHILINA OTTAWA* var. Jones.** See *Isochilina gregaria*.

***ISOCHILINA OTTAWA* var. *INTERMEDIA* Jones.** See *Isochilina gregaria*.

***Isochilina panolensis* Foerste.**

- Isochilina panolensis* Foerste, Bull. Kentucky Geol. Surv., 7, 1906, p. 328; Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 30, pl. 1, fig. 1.
 Clinton (Waco): Panola and near Irvine, Kentucky.

***Isochilina saffordi* Ulrich.**

- Isochilina saffordi* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 178, pl. 11, figs. 10a-d.
 Trenton (Catheys): Nashville, Tennessee.
Holotype.—Cat. No. 41288, U.S.N.M.

***ISOCHILINA SCOFFIELDI* Miller.** See *Macronotella scofieldi*.

***Isochilina seelyi* (Whitfield).**

- Primitia Seelyi* Whitfield, Bull. Amer. Mus. Nat. Hist., 2, 1889, p. 60, pl. 13, figs. 6, 7.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 744, figs.
Isochilina seelyi Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 23, pl. 1, fig. 7.—Seely, Vermont State Geol. Rep., 7, 1910, pl. 61, fig. 17.
 Canadian (Beekmantown): Shoreham, Vermont; Providence Island, Lake Champlain.

***Isochilina? subnodosa* Ulrich.**

- Isochilina subnodosa* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 177, pl. 11, figs. 7a-c.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 232, fig. 2.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 342, figs. 1656i-k.
 Trenton (Perryville): Perryville, etc., Kentucky.
Holotype.—Cat. No. 41294, U.S.N.M.

***Isochilina whiteavesi* Jones.**

- Isochilina whiteavesi* Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 68, pl. 10, figs. 13a, b.
 Trenton: Lorette Falls, Quebec.

***ISOGRAPTUS GIBBERULUS* Moberg.** See *Didymograptus (Isograptus) caduceus*.

***ISOTELOIDES* Raymond.**

Genotype: *I. whitfieldi* Raymond.

- Isoteloides* Raymond, Ann. Carnegie Mus., 7, No. 1, 1910, pp. 36, 67; 7th Rep. Vermont State Geol., 1910, p. 223; Trans. and Proc. Roy. Soc. Canada, 5, 3d ser., sec. 4, 1912, p. 115.

***Isoteloides angusticaudus* (Raymond).**

- Isotelus angusticaudus* Raymond, Ann. Carnegie Mus., 3, 1905, p. 345, pl. 13, figs. 3, 4.
Isoteloides angusticaudus Raymond, 7th Rep. Vermont State Geol., 1910, p. 223, pl. 35, figs. 3, 4; pl. 37, fig. 7; pl. 38, fig. 1; pl. 39, fig. 8; Ann. Carnegie Mus., 7, 1910, p. 68, pl. 17, fig. 7; pl. 18, fig. 1; pl. 19, fig. 8.—Perkins, Rep. Vermont State Geol., 8th ser., 1912, pl. 18, fig. 1.
 Chazy (Crown Point, Valcour): Valcour Island and Chazy, New York; Lake La Motte, Vermont.

Isoteloides homalonotoides (Walcott).

Asaphus homalonotoides Walcott, 31st Rep. New York State Mus. Nat. Hist., 1879, 1880, adv. sheets Sept. 20, 1877, p. 70.—Whitfield, Geol. Wisconsin, 4, 1882, p. 237, pl. 5, fig. 4.

Asaphus triangulatus Whitfield, Ann. Rep. for 1879, Wisconsin Geol. Surv., 1880, p. 59.

Isoteloides homalonotoides Raymond, Ann. Carnegie Mus., 7, 1910, p. 52, pl. 16, figs. 9–11.

Black River: Dunleith, Illinois; Grant County, Wisconsin; Pattersonville, New York; Ottawa, Canada.

Trenton: Smiths Basin, New York.

Isoteloides whitfieldi Raymond.

Asaphus canalis Whitfield (not Hall), Bull. Amer. Mus. Nat. Hist., 1, 1886, p. 336, pl. 34, figs. 1–8; *ibid.*, 2, 1889, p. 64, pls. 11, 12.—Seely, Vermont State Geol., Rep. 7, 1910, pl. 58.

Isotelus canalis Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 291, fig. 1600.

Isoteloides whitfieldi Raymond, Ann. Carnegie Mus., 7, 1910, p. 36, pl. 16, figs. 1–4, fig. 4.

Canadian (Beekmantown): Crown Point, New York; Fort Cassin, Vermont.

ISOTELUS DeKay.

Genotype: *I. gigas* DeKay.

Isotelus DeKay, Ann. Lyceum Nat. Hist. New York, 1, p. 174.—Green, Mon. Tril. N. A., 1832, pp. 17, 64.—Edwards, Hist. Nat. d. Crust., 3, 1840, p. 297.—Portlock, Rep. Geol. Londonderry, 1843, p. 293.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, pp. 541, 554.—McCoy, Ann. Mag. Nat. Hist., (2), 4, 1849, p. 399; British Pal. Rocks, Fossils, 1854, p. 169.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 215.—Salter, Mem. Geol. Surv. United Kingdom, dec. 11, 1864, pl. 3; Mon. British Tril., Pal. Soc., 1866, p. 147.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 137.—Zittel, Handb. Pal., 2, 1885, p. 608.—Brögger, Afh. Sveriges Geol. Unders., ser. C, No. 82, 1886, p. 31; Bihang till K. Sven. Vet.-Akad. Handl., 11, No. 3, 1886, p. 31.—Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 700.—Koken, Die Leitfossilien, Leipzig, 1896, p. 28.—Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 8th ser., 6, 1898, pp. 11, 12, 33.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1052.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 291.—Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 47.—Raymond, Trans. and Proc. Roy. Soc. Canada, 5, 3rd ser., sec. 4, 1912, p. 115; Zittel-Eastman Textb. Pal., 1913, p. 719.

ISOTELUS ALACER Billings. See *Brachyaspis alacer*.

ISOTELUS ANGUSTICAUDUS Raymond. See *Isoteloides angusticaudus*.

Isotelus arenicola Raymond.

Isotelus arenicola Raymond, Ottawa Nat., 24, 1910, p. 130, figs. 1, 2 (tpl. 2, fig. 5). Chazy (Aylmer): Deschenes and Britannia, near Ottawa, and West Hawkesbury, Canada.

ISOTELUS? BEARSI Raymond. See *Vogdesia bearsi*.

Isotelus benjamini Ulrich.

Isotelus benjamini Ulrich in Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 144, fig. 4.

Trenton (Upper): Covington and Rogers Gap, Kentucky.

Isotelus beta Raymond.

Asaphus sp. beta Raymond, Ann. Carnegie Mus., 3, 1906, p. 342, pl. 12, fig. 9.

Isotelus beta Raymond, 7th Rep. Vermont State Geol., 1910, pl. 36, fig. 9, pl. 39, figs. 4-7; Ann. Carnegie Mus., 7, 1910, p. 67, pl. 19, figs. 4-7.

Chazyan (Crown Point, Valcour): Crown Point, Valcour Island, Plattsburgh, and Chazy, New York.

Isotelus canalis Hall.

Isotelus canalis (Conrad MS.) Hall, Pal. New York, 1, 1847, p. 26, pl. 4 (bis), figs. 17-19.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 236, pl. 3, figs. 17-19.

Asaphus canalis Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 70 (gen. ref.).—Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 270, figs. 255a, b; p. 352, fig. 340.

Chazyan: Chazy, New York; Newfoundland.

Observation.—Neither defined nor figured so as to be recognized.

ISOTELUS CANALIS Clarke. See *Isotelus gigas*.

ISOTELUS CANALIS Grabau and Shimer. See *Isoteloides whitfieldi*.

ISOTELUS CANALIS Weller. See *Asaphellus gyracanthus*.

Isotelus covingtonensis Ulrich.

Isotelus covingtonensis Ulrich in Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1914, p. 145, figs. 1, 2.

Trenton (Upper): Covington, Rogers Gap, etc., Kentucky.

Isotelus cyclops Green.

Isotelus cyclops Green, Monthly Amer. Jour. Geol., 2, 1832, p. 560, pl., fig. 7; Mon. Tril. N. A., 1832, p. 69, fig. 7, cast 24.

Middle Ordovician: Western New York.

Plastotype.—Cat. No. 25703, U.S.N.M.

ISOTELUS EMORYI Walcott. See *Onchometopus emoryi*.

ISOTELUS FLORENCEVILLENIS Calvin. See *Onchometopus susae*.

ISOTELUS GIGAS of authors. See *Isotelus jacobus*, *I. latus*, and *I. iowensis*.

Isotelus gigas deKay.

Isotelus gigas deKay, Annals Lyceum Nat. Hist. New York, 1, 1824, p. 176, pl. 12, fig. 1; pl. 13, fig. 1.—Green, Monthly Amer. Jour. Geol., 1832, p. 560; Mon. Tril. N. A., 1832, p. 71, cast 21, 22.—Milne-Edwards, Crust., 3, 1840, p. 298.—Troost, 5th Geol. Rep. Tennessee, 1840, p. 57.—Vanuxem, Nat. Hist. New York, Geol., 3, 1842, p. 47, fig. 1.—Emmons, *ibid.*, 2, 1842, p. 389, fig. 1.—Mather, *ibid.*, 1, 1843, p. 397, fig. 1.—Goldfuss, Neues Jahrb. f. Min., etc., 1843, p. 554.—Owen, Amer. Jour. Sci., 47, 1844, p. 363, fig. 1.—Hall, Pal. New York, 1, 1847, p. 25, pl. 4 (bis), fig. 16; p. 231, pl. 60, figs. 7a-i; pl. 61, figs. 3a-f, 3i-m, 4a-c; pl. 62, figs. 1a-c, 2; pl. 63; also p. 254, pl. 66, fig. 5.—Emmons, Amer. Geology, 1, pt. 2, 1855, p. 215, pl. 16, figs. 9-12.—Billings, Canadian Nat. Geol., 1, 1856, pp. 45, 46, figs. 9, 11.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 819, fig. 610.—Emmons, Man. Geol., 1860, p. 100, fig. 89.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, pl. 3, fig. 11.—Hitchcock, Geol. Vermont, 2, 1862, pl. 12, fig. 5.—Chapman, Expos. Min., Geol. Canada, 1864, p. 136, fig. 140.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 302, figs.—Clarke, Geol. Minnesota, 3, pt 2, 1894, p. 701, figs. 6-8; p. 706.—Schuchert, Proc. U. S. Nat. Mus., 22, 1900, p. 174.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 192, pl. 14, figs. 6, 7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 292, fig. 1601.—Raymond, Ann.

Isotelus gigas—Continued.

- Carnegie Mus., 7, 1910, p. 53, pl. 15, figs. 1, 2.—Ruedemann, Bull. New York State Mus., 162, 1912, p. 116, pl. 10, fig. 1.—Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 47.—Raymond, Roy. Soc. Canada, Trans. and Proc., 3d ser., 5, sec. 4, 1912, p. 119, pl. 2, figs. 7, 9; p. 120, pl. 3, fig. 6; Bull. Mus. Comp. Zool., 58, 1914, p. 248, pl. 1, figs. 1, 2; pl. 2, figs. 2-5; pl. 3, fig. 3.
- Asaphus gigas* Dalman, K. K. Akad. Handl. for 1826, 1827, p. 276.—Packard, Amer. Nat., 14, 1880, pp. 505-508, figs. 2-4.—Nicholson and Etheridge, Mon. Sil. Foss. Girvan Dist., 1880, p. 153, pl. 10, figs. 18, 19.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 160, fig.—Miller, N. A. Geol. Pal., 1889, p. 531, fig. 967.—Rowley, Missouri Bur. Geol., Mines, 2d ser., 8, 1908, p. 57, pl. 15, fig. 2.
- Asaphus (Isotelus) gigas* Hall, Rep. Geol. Surv. Wisconsin, 1862, p. 41, fig. 5.—Miller, Cincinnati Quart. Jour. Sci., 1, 1874, p. 138.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 232.
- Asaphus platycephalus* Stokes, Trans. Geol. Soc. London, 2d ser., 1, 1824, p. 208.—Bronn, Leth. Geog., 1, 1835, p. 115, pl. 9, fig. 8.—Green, Amer. Jour. Sci., 37, 1839, p. 37.—Buckland, Bridgw. Treatise, 2, 1840, p. 76, pl. 63, fig. 12.—Burmeister, Org. Tril., 1846, p. 110, pl. 2, fig. 12 (Roy. Soc. ed., 1846).—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 219, fig. 229.—Chapman, Canadian Jour., n. s., 4, 1859, p. 142; 8, 1863, p. 29, fig. 140; p. 200, fig. 196; Expos. Min. and Geol., 1864, p. 172, fig. 196.—Billings, Canadian Nat., 1864 (2), 1, 1864, p. 370.—Woodward, Quart. Jour. Geol. Soc. London, 26, 1870, p. 487, fig. 1.—Dana, Amer. Jour. Sci., 3d ser., 1, 1871, pp. 320, 386; Ann. Mag. Nat. Hist., 4th ser., 7, 1871, p. 366.—Woodward, Geol. Mag., 8, 1871, pl. 8, fig. 1.—Dana, Canadian Nat., n. s., 6, 1872, p. 348.—Eichwald, Neues Jahrb. f. Min. Geol. Pal., 1873, p. 1, pl. 1.—Walcott, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875 (1877), footnote, p. 95; *ibid.*, mus. ed., 1879; 31st Rep. New York State Mus. Nat. Hist., 1879, pp. 62, 64; Bull. Mus. Comp. Zool., 8, 1881, pp. 191-216, pl. 2, fig. 9; Science, 3, 1884, p. 281.—Woodward, Geol. Mag., dec. 3, 1, 1884, p. 78, text fig.
- Asaphus (Isotelus) platycephalus* Burmeister, Org. der Tril., Berlin, 1843, p. 127, pl. 2, fig. 12.
- Isotelus platycephalus* Bronn and Roemer, Leth. Geog., 1, 1851-56, p. 632, pl. 9, fig. 8; pl. 9', fig. 5.
- Isotelus planus* DeKay, Ann. Lyceum Nat. Hist. New York, 1, 1824, p. 178, pl. 13, fig. 2.—Green, Monthly Amer. Jour. Geol., 1832, p. 560; Mon. Tril. N. A., 1832, p. 68, cast 23.—Goldfuss, Neues Jahrb. f. Mem., etc., 1843, pl. 554.
- Asaphus planus* Dalman, K. K. Akad. Handl., 1827, p. 276.
- Isotelus stagops* Green, Mon. Tril. N. A., 1832, p. 71, cast 26, 27.
- Brongniatia isotelea* Eaton, Geol. Textb., 2d ed., 1832, p. 33, pl. 2, fig. 22.
- Asaphus Murchisoni* Castelnau, Essai Syst. Sil. l'Amer. Sept., 1843, p. 19, pl. 4, fig. 3.
- ?*Isotelus canalis* Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 707, fig. 9.
- Mohawkian and Cincinnati: United States and Canada.
- Observation.—Several distinct species are undoubtedly recorded in the above citations. (See Raymond, 1914.)

Isotelus harrisi Raymond.

- Isotelus harrisi* Raymond, Annals Carnegie Mus., 3, 1905, p. 343, pl. 12, figs. 3, 5, 7.—Schmidt, Mem. Imp. Acad. Sci., St. Petersburg, 20, 1907, p. 75.—Raymond, 7th Rep. Vermont State Geol., 1910, p. 221, pl. 34, figs. 3, 5-7; pl. 37, fig. 1; Ann. Carnegie Mus., 7, 1910, p. 65, pl. 17, fig. 1, fig. 2.
- Chazy: Crown Point, Valcour Island, Chazy, and Coopersville, New York; Isle La Motte. Vermont (Crown Point, Valcour); Mingan Islands, Canada (Mingan).

Isotelus harrisi Raymond (part). See *Isotelus platymarginatus*.

Isotelus iowensis (Owen).

Asaphus (*Isotelus*) *iowensis* Owen, Rep. Geol. Surv. Wisconsin, Iowa, Minnesota, 1852, p. 577, tab. 2A, figs. 1-7.—Lealey, Geol. Surv. Pennsylvania Rep., P 4, 1889, p. 41, figs.

Isotelus iowensis Clarke, Geol. Minnesota, 3 pt., 2, 1894, p. 704.—Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 48, pl. 13, figs. 1, 2.—Raymond, Bull. Mus. Comp. Zool., 58, 1914, p. 255, pl. 2, fig. 6; pl. 3, figs. 1, 2.

Isotelus gigas Clarke (part), Geol. Minnesota, 3, pt. 2, 1894, p. 703, fig. 5.—Waller, Geol. Surv. New Jersey, Pal., 3, 1902, pl. 14, fig. 5.

Richmond (Maquoketa): Turkey River, Clermont, and Elgin, Iowa.

Cotypes.—Cat. No. 17906, U.S.N.M.

Isotelus jacobus Clarke.

Isotelus gigas Hall (part), Pal. New York, 1, 1847, pl. 61, figs. 3g, 3b.

Isotelus jacobus Clarke, Geol. Minnesota, 3, pt. 2, 1894, p. 706, footnote.

Trenton: Middleville, New York.

Isotelus latus Raymond.

Isotelus latus Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 45, pl. 5.

Asaphus platycephalus Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 184, text fig. 183; Cat. Sil. Foss. Anticosti, 1866, p. 24, fig. 7; Quart. Jour. Geol. Soc. London, 26, 1870, p. 486, pls. 31, 32.

Isotelus gigas Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 293, fig. 1602.

Trenton: Ottawa, Ontario.

Isotelus longævus Savage.

Isotelus longævus Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 103, pl. 6 fig., 15.

Upper Medinan (Edgewood): Near Edgewood, Illinois.

Isotelus maximus Locke.

Isotelus maximus Locke, 2d Ann. Rep. Geol. Surv. Ohio, 1838, p. 246, figs. 8, 9; Amer. Jour. Sci., 41, 1841, p. 161; Trans. Assoc. Amer. Geol. and Nat., 1843, p. 14.—Clarke, 10th Rep. State Geol. New York for 1890, 1891, p. 87; 44th Rep. New York State Mus., 1892, p. 111; Geol. Minnesota, 3, pt. 2, 1894, p. 701, figs. 5-7; p. 706.—Ruedemann, Bull. New York State Mus., 49, 1901, p. 59, pl. 4, fig. 1.—Raymond and Narraway, Ann. Carnegie Mus., 7, 1910, p. 55, fig. 3.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 292, fig. 1603.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1060, pl. 55, fig. 1.—Slocum, Field Mus. Nat. Hist., Geol. Ser., 4, 1913, p. 47.—Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 46, pl. 4, fig. 8; Bull. Mus. Comp. Zool., 58, 1914, p. 257.

Asaphus maximus Clarke, 46th Rep. New York State Mus., 1893, p. 195; 12th Rep. State Geol. New York for 1892, 1894, p. 49.

Asaphus (*Isotelus*) *maximus* Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 233.

Isotelus megistos Locke, Amer. Jour. Sci., 42, 1842, p. 366, pl. 3, fig.; Trans. Assoc. Amer. Geol., Nat., 1843, p. 221, pl. 6, fig. 1.—Anon., Amer. Jour. Sci., 2d ser., 6, 1848, p. 431.—Taylor, *ibid.*, 10, 1850, p. 113.

Asaphus megistos Chapman, Canadian Jour., n. s., 4, 1859, pp. 140, 142.—Billings, Geol. Canada, Geol. Surv. Canada, 1863, p. 184, fig. 182; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, pp. 26, 60.—Walcott, 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1877, p. 89; mus. ed., 1879, p. 89.—Mickelborough, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, pp. 200-206, figs. 1, 3 (2).—

Isotelus maximus—Continued.

Walcott, *Science*, 3, 1884, p. 280, fig. 1.—Woodward, *Geol. Mag.*, 3, 1, 1884, p. 162, figs. 1-3.—Ford and Dwight, *Amer. Jour. Sci.*, 3d ser., 31, 1886, p. 254, pl. 7, fig. 16.—Miller, *N. A. Geol. Pal.*, 1889, p. 531, fig. 968.—Beecher, *Amer. Jour. Sci.*, 4th ser., 13, 1902, p. 169, pl. 5, figs. 5, 6; *Geol. Mag.*, dec. 4., 9, 1902, p. 158, figs. 5, 6.—Rowley, *Missouri Bur. Geol. and Mines*, 2d ser., 8, 1908, p. 58, pl. 15, fig. 3.

Asaphus (*Isotelus*) *megistos* Meek, *Geol. Surv. Ohio, Pal.*, 1, 1873, p. 159, pl. 14, fig. 13.—Miller, *Cincinnati Quart.*, *Jour. Sci.*, 1, 1874, p. 137.

Trenton-Richmond: Cincinnati, Ohio. Many localities in the United States and Canada.

Pleiototype.—Cat. No. 33458, U.S.N.M. (Mickelborough).

Observation.—The above citations, like those of *I. gigas*, probably refer to several species.

Isotelus megalops Green.

Isotelus megalops Green, *Mon. Tril. N. Amer.*, 1832, p. 70, cast No. 25.

Trenton: Near Trenton Falls, New York.

Plastotype.—Cat. No. 25694, U.S.N.M.

ISOTELUS MEGISTOS Locke. See *Isotelus maximus*.

ISOTELUS OBTUSA Raymond. See *Onchometopus obtusus*.

ISOTELUS PLANUS DeKay. See *Isotelus gigas*.

ISOTELUS PLATYCEPHALUS Bronn. See *Isotelus gigas*.

Isotelus platymarginatus Raymond.

Isotelus harrisi (part) Raymond, *Ann. Carnegie Mus.*, 3, 1905, pl. 12, fig. 4.

Isotelus platymarginatus Raymond, *Ann. Carnegie Mus.*, 7, 1910, p. 66, pl. 17, figs. 2-5; pl. 19, fig. 3; 7th Rep. Vermont State Geol., 1910, p. 225, pl. 34, fig. 4; pl. 37, figs. 2-5; pl. 39, fig. 3.

Chazyan (Crown Point, Valcour): Valcour Island, New York; Isle La Motte, Vermont.

ISOTELUS STEGOPS Green. See *Isotelus gigas*.

ISOTELUS SUSÆ Clarke. See *Onchometopus susæ*.

ISOTRYPA AMBIGUA Ulrich. See *Loculipora ambigua*.

JAKELOCYSTIS Schuchert.

Genotype: *J. hartleyi* Schuchert.

Jaekelocystis Schuchert, *Amer. Geol.*, 32, 1903, p. 230; *Smiths. Misc. Coll.*, 47, 1904, p. 222.

Jaekelocystis avellana Schuchert.

Jaekelocystis avellana Schuchert, *Smiths. Misc. Coll.*, 47, 1904, p. 226, pl. 37, figs. 11, 12, fig. 28; *Maryland Geol. Surv., Low. Dev.*, p. 235, pl. 38, figs. 3, 4.

Helderbergian (Keyser): Keyser, West Virginia.

Holotype.—Cat. No. 35056, U. S.N.M.

Jaekelocystis hartleyi Schuchert.

Jaekelocystis hartleyi Schuchert, *Amer. Geol.*, 32, 1903, p. 231; *Smiths. Misc. Coll.*, 47, pt. 2, 1904, p. 224, fig. 27, pl. 37, figs. 4-8.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 468, fig. 1776.—Schuchert, *Maryland Geol. Surv., Low. Dev.*, 1913, p. 233, pl. 37, figs. 12-16.

Helderbergian (Keyser): Keyser, West Virginia.

Cotypes.—Cat. No. 35055, U.S.N.M.

***Jaekelocystis papillatus* Schuchert.**

Jaekelocystis papillatus Schuchert, *Smiths. Misc. Coll.*, 47, 1904, p. 225, pl. 37, figs. 9, 10; *Maryland Geol. Surv., Low. Dev.*, 1913, p. 234, pl. 38, figs. 1, 2. Helderbergian (Keyser): Keyser, West Virginia.
Holotype and paratype.—Cat. No. 35057, U.S.N.M.

JONESELLA Ulrich.Genotype: *J. crepidiformis* Ulrich.

Jonesella Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 13, 1890, p. 121.—Miller, N. A. *Geol. Pal.*, 1st App., 1892, p. 708.—Ulrich, *Geol. Minnesota*, 3, pt. 2, 1894, p. 667.—Grabau and Shimer, N. A. *Index Fossils*, 2, 1910, p. 349.—Bassler, *Zittel-Eastman Textb. Pal.*, 2d ed., 1913, p. 738.

JONESELLA CRASSA Ulrich. See *Ctenobolbina crassa*.

***Jonesella crepidiformis* (Ulrich).**

Leperditia crepidiformis Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 2, 1879, p. 10, pl. 7, figs. 3, 3a.

Jonesella crepidiformis Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 13, 1890, p. 122, pl. 7, figs. 8a-c; *Geol. Minnesota*, 3, pt. 3, 1894, p. 667, figs. 47a-c.—Grabau and Shimer, N. A. *Index Fossils*, 2, 1910, p. 349, figs. 1658a-c.—Bassler, *Zittel-Eastman Textb. Pal.*, 1913, p. 738, fig. 1425f.

Eden (Economy): Covington, Kentucky, and vicinity.

Cotypes.—Cat. No. 41359, U.S.N.M.

***Jonesella digitata* Ulrich.**

Jonesella digitata Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 13, 1890, p. 122, pl. 7, figs. 10a-c.

Richmond (Arnheim): Marion County, Kentucky.

Holotype.—Cat. No. 41358, U.S.N.M.

***Jonesella obscura* Ulrich.**

Jonesella obscura Ulrich, *Geol. Minnesota*, 3, pt. 2, 1894, p. 668, pl. 44, figs. 17-19. Trenton (Prosser): Cannon Falls, Minnesota.

Cotypes.—Cat. No. 41529, U.S.N.M.

***Jonesella pedigera* Ulrich.**

Jonesella pedigera Ulrich, *Jour. Cincinnati Soc. Nat. Hist.*, 13, 1890, p. 122, pl. 7, figs. 9a, 9b; *Geol. Minnesota*, 3, pt. 2, 1894, p. 667, figs. 47d, e.—Grabau and Shimer, N. A. *Index Fossils*, 2, 1910, p. 349, figs. 1658d, e.

Eden (Economy): Covington, Kentucky, and vicinity.

Holotype.—Cat. No. 41360, U.S.N.M.

JOVELLANIA Bayle.Genotype: *Orthoceras buchi* Verneuil.

Jovellania Bayle, *Bull. Soc. Geol. France*, 3d ser., 7, 1879, p. 91.—Foord, *Cat. Foss. Ceph. British Mus.*, 1, 1888, p. 326; *ibid.*, 2, 1891, p. 397.

JOVELLANIA CAPITOLINUM Foord. See *Actinoceras? cuvieri*.

***Jovellania murrayi* (Billings).**

Orthoceras murrayi Billings, *Geol. Surv. Canada, Rep. Progr. for 1853-56*, 1857, p. 332.

Jovellania murrayi Foord, *Cat. Foss. Ceph. British Mus.*, 1, 1888, p. 328, fig. 50. Black River: St. Joseph's Island, Lake Huron.

***Jovellania semiplanata* (Whiteaves).**

Orthoceras semiplanatum Whiteaves, *Trans. Roy. Soc. Canada*, 9, sec. 4, 1892, p. 81, pl. 8, figs. 3, 3a.

Jovellania semiplanata—Continued.

Tripteroceeras semiplanatum Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 214.

Jovellania semiplanata Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 4, 1906, p. 345 (gen. ref.).

Black River or Richmond: Lower Fort Garry, Manitoba.

KIONELASMA Simpson. See *Lindströmia* Nicholson and Thompson.

KIONOCERAS Hyatt.

Genotype: *Orthoceras doricum* Barrande.

Kionoceras Hyatt, Proc. Boston Soc. Nat. Hist., 22, 1883, p. 275.—Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 469.—Hyatt, Zittel-Eastman Textb. Pal., 1, 1900, p. 519; 2d ed., 1913, p. 600.—Clarke and Ruedemann, Mem. New York State Mus., 5, p. 82.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 61.

KIONOCERAS ANGULATUM Newell. See *Kionoceras cancellatum*.

Kionoceras bellatulum (Billings).

Orthoceras bellatulum Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 58.

Anticostian (Gun River and Jupiter River): Three miles east Challowpe River, Anticosti.

Kionoceras cancellatum (Hall).

Orthoceras cancellatum Hall (not Eichwald), Pal. New York, 2, 1852, p. 292, pl. 63, figs. 1, 4a, b; pl. 65, figs. 4a, b.

Orthoceras subcancellatum Hall in Miller, Amer. Pal. Foss., 1st ed., 1877, p. 245; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 323, pl. 33, fig. 5.—Lesley, Geol. Surv. Pennsylvania, Rep. P4, 1889, p. 559, fig.

Kionoceras cancellatum Whiteaves, Geol. Surv. Canada, Ann. Rep., n. s., 14, App. F, 1904, p. 55; Geol. Surv. Canada, Pal. Fossils, 3, pt. 4, 1906, p. 264 (discusses synonymy).

Orthoceras columnare Hall (not Marklin, 1857), Rep. Progr. Geol. Surv. Wisconsin, 1867, p. 4; 20th Rep. New York State Cab. Hist., 1868, p. 351, pl. 19, (10), figs. 4-8 (extras Jan., 1865); rev. ed. 1868 (1870), p. 411, pl. 19, figs. 4-8, 8.

Kionoceras columnare Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 469.

Orthoceras orus Hall in Miller, Amer. Pal. Foss., 1st ed., 1877, p. 245.

Orthoceras (*Kionoceras*) *orus* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 469, pl. 21, fig. 1; pl. 25, fig. 2.

Kionoceras orus Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 62, fig. 1266.

Orthoceras Hoyi McChesney, Desc. New Fossils, 1861, p. 92.

Orthoceras lineolatum McChesney, Desc. New Fossils, 1861, p. 93.

Orthoceras irregulare McChesney, Desc. New Fossils, 1861, p. 94.

Orthoceras woodworthi McChesney, Plates Illust. New sp. Fossils, 1865, pl. 7, fig. 7; Trans. Chicago Acad. Sci., 1, 1868, p. 53, pl. 7, fig. 7.

Orthoceras cadmus Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 83.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 38.

Orthoceras virgatum? Hall (not Sowerby), Pal. New York, 2, 1852, p. 298, pl. 63, figs. 2a, b, 3.

Orthoceras scammoni McChesney, Desc. New Fossils, 1861, p. 92.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 101.—Hall, 20th Rep. New York State Cab. Hist., 1868, p. 381; rev. ed. 1868 (1870), p. 412, footnote.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 99.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 77.

Kionoceras cancellatum—Continued.

Orthoceras angulatum Hall (not Wahlenberg, 1821), 20th Rep. New York State Cab. Hist., 1868, p. 353, pl. 19 (10), figs. 10, 11; rev. ed. 1868 (1870), p. 413, pl. 19, figs. 9-11; pl. 24, fig. 1.—Meek and Worthen, Geol. Surv. Illinois, 6, 1875, p. 504, pl. 24, figs. 8, 8a.

Orthoceras (*Kionoceras*) *angulatum* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 472, pl. 21, fig. 3.

Kionoceras angulatum Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 470.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 61, fig. 1265.

Clinton-Guelph: Rochester and Lockport, New York; Ontario; Ohio; Indiana; Illinois; Wisconsin; etc.

Observation.—The name *cancellatum* and the above synonymy is held until a careful study of these cephalopods is made.

Pterotype.—Cat. No. 52951, U.S.N.M. (Kindle and Breger).

KIONOCERAS COLUMNARE Newell. See *Kionoceras cancellatum*.

Kionoceras crawfordi (Foerste).

Orthoceras (*Kionoceras*) *crawfordi* Foerste, Proc. Boston Soc. Nat. Hist., 24, 1889, p. 284, pl. 5, fig. 26; Geol. Surv. Ohio, Pal., 7, 1893, p. 546, pl. 30, fig. 26.

Upper Medinan (Brassfield): Soldiers' Home, near Dayton, Ohio.

Kionoceras darwini (Billings).

Orthoceras darwini Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 161 (adv. sheets, 1861).—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 38, pl. 6, figs. 2, 2a; *ibid.*, pt. 2, 1895, p. 100.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 76, fig. 8.

Orthoceras (*Kionoceras*) *darwini* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 811 (gen. ref.).

Kionoceras darwini Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 84, pl. 10, fig. 22; pl. 11, fig. 6; pl. 12, figs. 1-8.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 62, fig. 1267.

Cyrtoceras myrice Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 149, pl. 8, fig. 9.—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 1, 1884, p. 39, pl. 6, figs. 3, 3a.

Niaganan (Guelph): New Hope, Durham, etc., Ontario; Shelby and Rochester, New York; Yellow Springs, Ohio; Offley Island, Kennedy Channel, Arctic America.

Kionoceras delphiense (Kindle and Breger).

Orthoceras (*Kionoceras*) *delphiensis* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 470, pl. 20, figs. 1, 2.

Niaganan: Delphi, Indiana.

Kionoceras kentlandense (Kindle and Breger).

Orthoceras (*Kionoceras*) *kentlandensis* Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 470, pl. 21, fig. 2.

Niaganan: Kentland, Indiana.

Kionoceras laqueatum (Hall).

Orthoceras laqueatum Hall, Pal. New York, 1, 1847, p. 13, pl. 3, fig. 12; pl. 56, figs. 2a-c; *ibid.*, var. a, p. 206, pl. 56, fig. 3.—Emmons Amer. Geology, 1, pt. 2, 1855, p. 149.—Emerson, Narrative Hall's 2d Arctic Exped., U. S. Navy Dept., 1879, p. 579.—Foord, Cat. Foss. Ceph. Brit. Mus., 1, 1888, p. 16.—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 552, figs.

Kionoceras laqueatum—Continued.

Orthoceras (*Kionoceras*) *laqueatum* Clarke and Ruedemann, Bull. New York State Mus., 65, 1903, p. 627 (gen. ref.).

Canadian (Beekmantown): New York.

Kionoceras magnisulcatum (Billings).

Orthoceras magnisulcatum Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857, p. 330; Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 23 (loc. ref.).—Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 3, 1897, p. 212.

Richmond: Charleton Point, Anticosti (Charleton); Lake Winnipeg, Canada.

KIONOCERAS MEDULLARE Clarke and Ruedemann. See *Protokionoceras medullare*.

KIONOCERAS ORUS Grabau and Shimer. See *Kionoceras cancellatum*.

Kionoceras strix (Hall and Whitfield).

Orthoceras strix Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 149, pl. 9, fig. 3.—Foord, Cat. Foss. Ceph. British Mus., 1, 1888, p. 76.—Lealey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 558, fig.

Kionoceras strix Newell, Proc. Boston Soc. Nat. Hist., 23, 1888, p. 469.

Niagaran (Guelph): Yellow Springs, Ohio; Wabash, Indiana.

KLITAMBONITES Pander. See *Clitambonites* Pander.

KLOEDENELLA Ulrich and Bassler. Genotype: *Kloedenia pennsylvanica* Jones.

Kloedenella Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 317.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 358.—Bonnema, Kon. Akad. Wetensch. Amsterdam, 1914, p. 4.

Kloedenella clarkel (Jones).

Beyrichia clarkel Jones, Jour. Geol. Soc. London, 46, 1890, p. 17, fig. 2.

Bollia clarkel Ulrich, Geol. Minnesota, 3, 1894, pt. 2, p. 669.

Kloedenella clarkel Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 319; Maryland Geol. Surv., Low. Dev., 1913, p. 533, pl. 97, fig. 21.

Helderbergian: Herkimer County, New York (Manlius transition); Cumberland, Maryland (Keyser).

Kloedenella clarkel paupera Ulrich and Bassler.

Kloedenella clarkel paupera Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 43, fig. 5; Maryland Geol. Surv., Low. Dev., 1913, p. 534, pl. 98, figs. 1-3.

Helderbergian (Keyser): Cumberland, Maryland.

Holotype.—Cat. No. 53280, U.S.N.M.

Kloedenella halli (Jones).

Beyrichia halli Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 15, pl. 4, fig. 21.

Bollia halli Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 669 (gen. ref.).

Kloedenella halli Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 319, fig. 62, pl. 43, fig. 4.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 359, fig. 1663q.

Helderbergian (Manlius transition): Herkimer County, etc., New York.

Kloedenella pennsylvanica (Jones).

Kloedenia pennsylvanica Jones, Amer. Geol., 4, 1889, p. 341, pl., figs. 5a-d, 6 (not 7a, b, 8, 9).

Kloedenella pennsylvanica Ulrich and Bassler, Proc. U. S. Nat. Mus., 1908, 35, p. 304, fig. 54; p. 318, pl. 43, figs. 1-3; Maryland Geol. Surv., Low. Dev., 1913, p. 533, pl. 97, figs. 18-21.

Helderbergian: Perry County, Pennsylvania; Tonoloway, etc., Maryland, (Keyser).

***Kloedenella symmetrica* (Hall).**

- Beyrichia symmetrica* Hall, Pal. New York, 2, 1852, p. 317, pl. 67, fig. 16.
Bollia symmetrica Jones, Amer. Geol., 4, 1889, p. 339 (gen. ref.); Quart. Jour. Geol. Soc. London, 46, 1890, p. 12.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 657.—Grabau, Bull. New York State Mus., 45, 1901, p. 219, fig. 151; Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 219, fig. 151.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 319, fig. 61.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 352, fig. 1661.
Bollia lata Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 12.
 Clinton (Rochester): Lockport, Rochester, etc., New York; Ontario; Pennsylvania; Maryland.

***Kloedenella trisulcata* (Hall).**

- Beyrichia trisulcata* Hall, Pal. New York, 3, 1859, p. 381.—Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 14, pl. 1, fig. 2.
Kloedenella trisulcata Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 318.
 Helderbergian (Manlius transition): Herkimer County, New York.

***Kloedenella turgida* Ulrich and Bassler.**

- Kloedenia pennsylvanica* Jones (part), Amer. Geol., 4, 1889, p. 341, figs. 8, 9 (not figs. 5-7).
Kloedenella turgida Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 318, pl. 43, figs. 6, 7; Maryland Geol. Surv., Low. Dev., 1913, p. 535, pl. 98, figs. 4-6.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 738, fig. 14251.
 Helderbergian (Keyser): Perry County, Pennsylvania; Cumberland, Maryland; Keyser, West Virginia.
Cotypes.—Cat. No. 53278, U.S.N.M.

***Kloedenella turgida ventrosa* Ulrich and Bassler.**

- Kloedenia pennsylvanica* Jones (part), Amer. Geol., 4, 1889, p. 341, figs. 7a, 7b (not figs. 5, 6, 8, 9).
Kloedenella turgida ventrosa Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 43, fig. 8; Maryland Geol. Surv., Low. Dev., 1913, p. 535, pl. 98, fig. 7.
 Helderbergian (Keyser): Perry County, Pennsylvania; Cumberland, Maryland.
Holotypes.—Cat. No. 53279, U.S.N.M.

***KLOEDENIA* Jones and Holl.**Genotype: *Beyrichia wilckensiana* Jones.

- Kloedenia* Jones and Holl, Ann. Mag. Nat. Hist., 5th ser., 17, 1886, p. 362.—Krause, Zeits. d. d. geol. Gesell., 41, 1889, p. 21.—Koken, Die Leitfossilien, Leipzig, 1896, p. 39, fig. 26A.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 708.—Ulrich, Zittel-Eastman Textb. Pal., 1, 1900, p. 644.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 1908, p. 300.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 355.

***Kloedenia barretti* (Weller).**

- Beyrichia barretti* Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 254, pl. 23, fig. 9.
Kloedenia barretti Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 301 (gen. ref.); Maryland Geol. Surv., Low. Dev., 1913, p. 532, pl. 97, fig. 17.
 Helderbergian: Two miles south of Tristates, New York (Decker Ferry); Tomoloway, Maryland (Keyser).

***Kloedenia centricornis* Ulrich and Bassler.**

- Kloedenia centricornis* Ulrich and Bassler, Proc. U. S. Nat. Mus., 1908, 35, pl. 33, fig. 23; Maryland Geol. Surv., Low. Dev., 1913, p. 529, pl. 97, figs. 1-4.—Bassler, Zittel-Eastman Textb. Pal., 1913, p. 738, fig. 14251.
 Helderbergian (Keyser): Cumberland, Maryland.
Holotype.—Cat. No. 53305, U.S.N.M.

***Kloedenia fimbriata* Ulrich and Bassler.**

Kloedenia fimbriata Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, pl. 38, fig. 22; Maryland Geol. Surv., Low. Dev., 1913, p. 529, pl. 97, figs. 5-7.

Helderbergian: Herkimer County, New York; Cumberland, Maryland (Keyser).

Holotype.—Cat. No. 53306, U.S.N.M.

***Kloedenia initialis* (Ulrich).**

Beyrichia initialis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 658, pl. 43, figs. 82, 83.

Kloedenia initialis Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 301, pl. 38, figs. 12, 13.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 355, fig. 1663, e, f.

Black River (Decorah): Minneapolis, Minnesota.

Holotype.—Cat. No. 41666, U.S.N.M.

***Kloedenia jerseyensis* (Weller).**

Beyrichia jerseyensis Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 255, pl. 23, fig. 5.

Kloedenia jerseyensis Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 301.

Helderbergian (Decker Ferry): Two miles south of Tristates, New York.

***Kloedenia kokomoensis* Foerste.**

Kloedenia kokomoensis Foerste, Cincinnati Soc. Nat. Hist., Jour., 21, 1909, p. 32, pl. 1, figs. 3a-b.

Oayugan (Kokomo): Kokomo, Indiana.

***Kloedenia kummeli* (Weller).**

Beyrichia kummeli Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 266, pl. 24, fig. 21.

Kloedenia kummeli Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 301 (gen. ref.); Maryland Geol. Surv., Low. Dev., 1913, p. 531, pl. 97, fig. 16.

Helderbergian: Two miles south of Tristates, New York ("Manlius"); Tonoloway, Maryland (Keyser).

***Kloedenia manliensis* (Weller).**

Beyrichia manliensis Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 268, pl. 23, fig. 10.

Kloedenia manliensis Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 301, pl. 38, fig. 21.

Kloedenia manliusensis Clarke, Mem. New York State Mus., No. 9, pt. 2, 1909, p. 20.

Helderbergian: Two miles South of Tristates, New York (Keyser—"Manlius"); Dalhousie, New Brunswick (Dalhousie).

Pleiotypes.—Cat. No. 53941, U.S.N.M.

***Kloedenia manliensis deckerensis* (Weller).**

Beyrichia deckerensis Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 256, pl. 23, fig. 11.

Kloedenia manliensis deckerensis Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 301.

Helderbergian (Decker Ferry): Two miles south of Tristates, New York.

KLOEDENIA MANLIUSSENSIS* Clarke. See *Kloedenia manliensis*.**Kloedenia monroensis* Grabau.**

Kloedenia monroensis Grabau, Michigan Geol. Surv., Geol., 1st ser., 1909, p. 206, pl. 15, fig. 11.

Lower Monroan (Raisin River): Newport, Michigan.

Kloedenia montaguensis (Weller).

Beyrichia montaguensis Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 267, pl. 24, fig. 23.

Kloedenia montaguensis Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 301.
Helderbergian ("Manlius"): Two miles south of Tristates, New York.

Kloedenia nearpassi (Weller).

Beyrichia nearpassi Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 255, pl. 23, figs. 7, 8.

Kloedenia nearpassi Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 301, p. 304, fig. 55, 56 (gen. ref.); Maryland Geol. Surv., Low. Dev., 1913, p. 538, pl. 97, figs. 12, 13.

Helderbergian: Two miles south of Tristates, New York (Decker Ferry); Tonoloway, Maryland (Keyser).

Kloedenia notata (Hall).

Beyrichia notata Hall, Pal. New York, 3, 1859, p. 379.

Kloedenia notata Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 13, pl. 4, figs. 22, 23.

Helderbergian (Manlius transition): Herkimer County and near Utica, New York.

KLOEDENIA PENNSYLVANICA JONES. See *Kloedenella pennsylvanica*, *K. turgida*, and *K. turgida ventrosa*.

Kloedenia prænuntia Ulrich and Bassler.

Kloedenia prænuntia Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 301, pl. 38, fig. 15.

Trenton (Hermitage): Four miles south of Carthage, Tennessee.

Holotype.—Cat. No. 41643, U.S.N.M.

Kloedenia smocki (Weller).

Beyrichia smocki Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 268, pl. 24, fig. 24.

Kloedenia smocki Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 302.

Helderbergian ("Manlius"): Two miles south of Tristates, New York.

Kloedenia sussexensis (Weller).

Beyrichia sussexensis Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 253, pl. 23, figs. 3-4.

Kloedenia sussexensis Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 302, pl. 38, figs. 19, 20; Maryland Geol. Surv., Low. Dev., 1913, p. 532, pl. 97, figs. 14, 15.

Beyrichia perinflata Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 254, pl. 23, fig. 6.

Helderbergian: Two miles south of Tristates, New York (Decker Ferry); Tonoloway, Maryland (Keyser); Dalhousie, New Brunswick (Dalhousie).

Plesiotypes.—Cat. No. 53940, U.S.N.M.

Kloedenia wallpackensis (Weller).

Beyrichia wallpackensis Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 266, pl. 24, fig. 22.

Kloedenia wallpackensis Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 302.
Helderbergian ("Manlius"): Two miles south of Tristates, New York.

KOKENIA Ulrich and Scofield. See *Kokenospira* Bassler.

KOKENOSPIRA Bassler (new name). Genotype: *Bucanella esthona* Koken.
Bucanella Koken (part), Neues Jahrb. Min., Geol., Beilageband, 6, 1889, p. 389
(not Meek, 1870).

Kokenia Ulrich and Scofield (not Holzapfel, 1895), Geol. Minnesota, 3, pt. 2,
1897, pp. 849-882.

Kokenospira costalis (Ulrich and Scofield).

Kokenia costalis Ulrich and Scofield, Geol. Minnesota, 3, pt. 2, 1897, p. 882, pl.
64, figs. 46-49.—Schuchert, Proc. U. S. Nat. Mus., 1900, p. 164.

Trenton: Near Cannon Falls, Minnesota (Prosser); Frobisher Bay, Baffin Land.
Holotype.—Cat. No. 45868, U.S.N.M.

KRAUSELLA Ulrich.

Genotype: *K. inæqualis* Ulrich.

Krausella Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 691.—Miller, N. A. Geol. Pal.,
2d App., 1897, p. 788.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p.
362.

Krausella anticostiensis (Jones).

Bairdia anticostiensis Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 548,
pl. 21, figs. 3a, b.

Krausella anticostiensis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 691.

Richmond (English Head, Charleton): English Head, etc., Anticosti.

Krausella arcuata Ulrich.

Krausella arcuata Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 692, pl. 44, figs.
47-53.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 362, figs. 1667a-c.

Black River: Minneapolis, Minnesota; Mineral Point, Wisconsin; Dixon, Illinois
(Platteville); High Bridge, Kentucky (Lowville).

Cotypes.—Cat. Nos. 41717-41719, U.S.N.M.

Krausella inæqualis Ulrich.

Krausella inæqualis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 692, pl. 44, figs.
44, 46.

Black River (Platteville): Dixon, Illinois.

Holotype.—Cat. No. 41727, U.S.N.M.

KUTORGINA Hall and Clarke. See *Billingsella* Hall and Clarke.

LABECHIA Edwards and Haime.

Genotype: *Monticularia conferta* Lonsdale.

Labechia Edwards and Haime, Mon. Polyp. Foss. Terr. Pal., 1851 (Arch. Mus.
Hist. Nat., 5), pp. 155, 279.—Pictet, Traite de Pal., 2d ed., 4, 1857, p. 444.—
Milne-Edwards, Hist. Nat. Corall., 3, 1860, p. 284.—Salter, Cat. Camb. Sil.
Foss., 1873, p. 109.—Lindstrom, Ann. Mag. Nat. Hist., 4th ser., 18, 1876,
p. 4.—Steinmann, Palæontographica, 25, 1878, p. 112.—Nicholson and
Murie, Jour. Linnean Soc. London, Zool., 14, 1878, p. 234.—Nicholson, Tab.
Corals Pal. Period, 1879, p. 350.—Zittel, Handb. Pal., 1, 1879, p. 287.—
Roemer, Leth. geog., pt. 1, Leth. Pal., 1883, p. 541.—Nicholson, Mon. British
Strom., Pal. Soc., 1886, p. 13, 19, 60.—Waagen, Neues Jahrb. f. Min., Geol.
Pal., 1, 1889, p. 259.—Grabau and Shimer, N. A. Index Fossils, 1, 1906, p.
46.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 699.—
Parks, Univ. Toronto Studies, Geol. Ser., 5, 1908, p. 31; *ibid.*, No. 7, 1910, p. 25.

LABECHIA CANADENSE Nicholson. See *Stromatocerium canadense*.

LABECHIA CORRUGATA Foerste. See *Dermatostroma corrugatum*.

LABECHIA CORRUGATA-GLYPTA Foerste. See *Dermatostroma glyptum*.

Labechia delicatula Parks.

Labechia delicatula Parks, Univ. Toronto Studies, Geol. Ser., No. 5, 1908, p. 32, pl. 9, figs. 4-6

Clinton (Osgood): Osgood, Indiana.

Cotypes.—Cat. No. 41218, U.S.N.M.

Labechia durhamensis Parks.

Labechia durhamensis Parks, Univ. Toronto Studies, Geol. Ser., No. 4, 1907, p. 20, pl. 2, figs. 4-6; pl. 3, fig. 1; pl. 6, figs. 1, 2.

Niagaran (Guelph): Durham, Guelph, etc., Ontario.

LABECHIA HURONENSIS Whiteaves. See *Stromatocerium huronense*.

Labechia macrostyla Parks.

Labechia macrostyla Parks, Univ. Toronto Studies, Geol. Ser., No. 7, 1910, p. 25, pl. 22, fig. 12; pl. 23, figs. 1, 2, 11.

"Lower Trenton drift": Ann Arbor, Michigan.

Holotype.—Cat. No. 36929, U.S.N.M.

Labechia minora Parks.

Labechia minora Parks, Univ. Toronto Studies, Geol. Ser., No. 4, 1907, p. 22, pl. 3, figs. 2, 5, 6.

Niagaran (Guelph): Elora, Durham, etc., Ontario.

LABECHIA MONTIFERA Ulrich. See *Stromatocerium montiferum*.

LABECHIA OHIOENSIS Nicholson. See *Stromatocerium huronense*.

LABECHIA PAPILLATA of authors. See *Dermatostroma papillatum*.

LABECHIA SCABRA Harper and Bassler. See *Dermatostroma scabrum*.

Labechia subcylindrica (James).

Stromatopora subcylindrica James, Jour. Cincinnati Soc. Nat. Hist., 7, 1884, p. 20, fig. 1.—J. F. James, *ibid.*, 9, 1887, pp. 39, 103, 251; *ibid.*, 15, 1892, p. 90.—Miller, N. A. Geol. Pal., 1889, p. 166.

Labechia subcylindrica Parks, Univ. Toronto Studies, Geol. Series, No. 7, 1910, p. 27, pl. 23, figs. 3, 4, 6, 7.

Richmond (Waynesville): Near Morrow, Ohio.

LABYRINTHITES Lambe.

Genotype: *L. chidlensis* Lambe.

Labyrinthites Lambe, Cruise of the "Neptune," App. 4, 1906, p. 327.

Labyrinthites chidlensis Lambe.

Labyrinthites chidlensis Lambe, Cruise of the "Neptune," App. 4, 1906, p. 328.
Ordovician?: Cape Chidley, Hudson Strait, Arctic America.

LACCOPHYLLUM Simpson.

Genotype: *L. acuminatum* Simpson.

Laccophyllum Simpson, Bull. New York State Mus., 39, 1900, p. 201.

Laccophyllum acuminatum Simpson.

Laccophyllum acuminatum Simpson, Bull. New York State Mus., 39, 1900, p. 202, figs. 7-9.

Niagaran (Brownsport): Perry County, Tennessee.

LAGENOGRAPTUS Hall. See *Monograptus* Geinitz.

LAMELLOPORA Owen. See *Strombodes* Schweigger.

LAMPTEROCRINUS Roemer.Genotype: *L. tennesseensis* Roemer.

Balanocrinites Troost (not Agassiz, 1845), Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 50 (not defined); Amer. Jour. Sci. and Arts, (2) 8, 1847, p. 419.—Roemer, Sil. Fauna West Tennessee, Breslau, 1860, p. 31.

Balanocrinus Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 131.

Lampteroocrinus Roemer, Sil. Fauna West Tennessee, Breslau, 1860, p. 40.—Hall, Trans. Albany Inst., 4, 1863, p. 202.—Hall, 20th Rep. New York State Cab. Nat. Hist. (extras 1865), 1868, p. 328; *ibid.*, rev. ed., 1870, footnote, p. 372.—Zittel, Handb. d. Pal., 1, 1879, p. 375.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, pp. 358, 373 (Rev. Pal., pt. 2, pp. 184, 199); *ibid.*, 1885, p. 323.—Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 260.—De Loriol, Pal. Francaise, 11, 1882, p. 59.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 207.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 199, fig. 124.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 145.—Weller, Bull. Chicago Acad. Sci., 4, pt. 1, 1900, p. 80, fig. 39.—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 102.—Zittel, Grundzuge Pal., 2, 1910, p. 161.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 548.—Springer, Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 187.

***Lampteroocrinus? comptus* Rowley.**

Lampteroocrinus? comptus Rowley, Amer. Geol., 34, 1904, p. 279, pl. 16, figs. 57, 58. Upper Medinan (Edgewood): Three miles west of Louisiana, Missouri.

***Lampteroocrinus? dubius* Weller.**

Lampteroocrinus? dubius Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 84, pl. 2, figs. 6, 7.

Niagaran (Racine): Lemont and Joliet, Illinois.

***Lampteroocrinus inflatus* (Hall).**

Balanocrinus inflatus Hall, Rep. Sup. Geol. Surv. Wisconsin, 1861, p. 22.

Lampteroocrinus inflatus Hall, Prelim. Notice, 18th Rep. New York State Cab. Nat. Hist., 1865, p. 24, pl. 1, fig. 6; 20th Rep. New York State Cab. Nat. Hist., 1868 (extras 1865), p. 328, pl. 10 (1), fig. 6; rev. ed., p. 374, pl. 10, fig. 6.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 81, figs. 2-3.

Niagaran (Racine): Racine, Wisconsin; Bridgeport and Romeo, Illinois.

***Lampteroocrinus parvus* Hall.**

Lampteroocrinus parvus Hall, 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 272, pl. 15, fig. 6; Trans. Albany Inst., 10, 1883, p. 65.

Niagaran (Waldron): Waldron, Indiana.

***Lampteroocrinus robustus* Weller.**

Lampteroocrinus robustus Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 83, pl. 2, figs. 4, 5.

Niagaran (Racine): Romeo, Lemont, and Joliet, Illinois.

***Lampteroocrinus? subglobosus* Weller.**

Lampteroocrinus? subglobosus Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 83, pl. 3, fig. 5.

Niagaran (Racine): Bridgeport and Hawthorne, Illinois.

Lampterocrinus tennesseensis Roemer.

Lampterocrinus tennesseensis Roemer, Sil. Fauna West. Tennessee, Breaker, 1860, p. 37, pl. 4, figs. 1a, 1b; Leth. geog., 1, Leth. Pal., Atlas, 1876, pl. 11, fig. 13.—Miller, N. A. Geol. Pal., 1889, p. 257, fig. 347.—Wachsmuth and Springer, Mem. Mus. Comp. Zool., Harvard, 20, 1897, p. 208, pl. 13, figs. 10a-d.—Bather, Treatise on Zoology, pt. 3, Echinoderma, 1900, p. 199, fig. 124.—Foerste, Jour. Geol., 11, 1903, p. 712 (loc. occ.).—Wood, Bull. U. S. Nat. Mus., 64, 1909, p. 103, pl. 7, figs. 8-10.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 548, fig. 1877.

Balanocrinites sculptus Troost, Amer. Jour. Sci. Arts, 2d ser., 8, 1850, p. 419; Proc. Amer. Assoc. Adv. Sci., 2, 1850, p. 60 (nom. nud.).

Niagaran (Brownspont): Decatur and Wayne Counties, Tennessee.

Plesiotypes.—Cat. No. 39920, U.S.N.M. (Troost's type of *B. sculptus*).

LAPWORTHURA CYLINDRICA Parks. See *Tæniaster cylindricus*.

LASIOCRINUS Kirk.

Genotype: *Homocrinus scoparius* Hall.

Homocrinus Hall (part), Pal. New York, 2, 1852, p. 185; *ibid.*, 3, 1859, p. 102.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, Rev. Pal., pt. 1, 1879; *ibid.*, 1886, p. 77; pt. 3, p. 220.—Bather, Crin. Gotland, 1893, p. 101. *Lasiocrinus* Kirk, Proc. U. S. Nat. Mus., 46, 1914, p. 482.

Lasiocrinus scoparius (Hall).

Homocrinus scoparius Hall, Pal. New York, 3, 1859, p. 102, pl. 1, figs. 1-9.—Bather, Kongl. Svenska Vet. Akad. Handl., 25, 1893, p. 105.—Talbot, Amer. Jour. Sci., 20, 1905, p. 19, pl. 3, fig. 3.

Dendrocrinus (*Homocrinus*) *scoparius* Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1881, p. 302 (Rev. Pal., 1, p. 79).

Lasiocrinus scoparius Kirk, Proc. U. S. Nat. Mus., 46, 1914, p. 482.

Helderbergian (Manlius transition beds or Coeymans): Schoharie and Wheelocks Hill, Litchfield, Herkimer County, New York.

LASIOGRAPTUS Lapworth.

Genotype: *L. costatus* Lapworth.

Lasiograptus Lapworth, Geol. Mag., 10, 1873, p. 559.—Zittel, Handb. Pal., 1, 1879, p. 302.—Koken, Die Leitfossilien, Leipzig, 1896, p. 329.—Roemer and Frech, Leth. geog., 1, Theil, Leth. Pal., 1, 3, Lief, 1897, p. 671.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 472-479.

Lasiograptus bimucronatus (Nicholson).

Graptolithus sp. Hall, Pal. New York, 3, 1859, p. 507, figs. 1-3.

Diplograptus bimucronatus Nicholson, Ann. Mag. Nat. Hist., 4, 1869, p. 236, pl. 11, fig. 12.—Clarke, Geol. Mag., 4th ser., 9, 1902, p. 499.

Hallograptus bimucronatus Lapworth, Cat. West. Scott. Foss., 1876, p. 7, pl. 2, fig. 58.

Hallograptus (*Lasiograptus*) *bimucronatus* Roemer and Frech, Leth. Pal., 1, 1897, p. 672, fig. 224.

Diplograptus (*Hallograptus*) *bimucronatus* Lapworth, Belfast Field Club, Ann. Rep. and Proc., 2d ser., app., pt. 4, 1877, p. 134, pl. 6, fig. 23.

Lasiograptus bimucronatus Tullberg, Sver. Geol. Und. Ser. C, No. 50, 1882, p. 20.

Lasiograptus mucronatus Lapworth, Proc. and Trans. Roy. Soc. Canada, 4, 1887, p. 178.—Gurley, Jour. Geol., 4, 1896, p. 299.—Roemer and Frech, Leth. Pal., 1, 1897, p. 672, fig. 224.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 481-483, pl. 29, figs. 12-18; pl. 30, figs. 6-8; pl. 31, figs. 4-5; text figs. 458-463.

***Lasiograptus bimucronatus*—Continued.**

Graptolithus whitfieldi (part) Hall, Geol. Surv. Canada, Canadian Org. Rem., dec. 2, 1865, pl. B, figs. 6–11.

Ordovician: Scotland (Glenkiln); Wales; Ireland; Scania; Kenwood, Stockport, etc., New York (Normanskill); Arkansas.

***Lasiograptus bimucronatus timidus* Ruedemann.**

Lasiograptus bimucronatus mut. *timidus* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 483–484, pl. 29, figs. 19, 20; text figs. 464, 465.

Utica: Flat Creek, near Mohawk, and Holland Patent, New York; Cincinnati, Ohio.

***Lasiograptus* (*Thysanograptus*) *eucharis* (Hall).**

Retiograptus eucharis Hall, Geol. Surv. Canada, Can. Org. Rem., dec. 2, 1865, p. 146, pl. 14, fig. 9; New York State Cab. Nat. Hist., 20th Ann. Rep., 1868, pp. 206, 224, pl. 4, fig. 9.—Walcott, Trans. Alb. Inst., 10, 1881 (adv. sheets, 1879, p. 35).—Ami, Can. Geol. Surv. Ann. Rep., pt. 11, 1889, pp. 23K, 117K; Can. Rec. Sci., 5, 1893, pp. 180, 236.—Roemer and Frech, Leth. geog., 1 Theil., Leth. Pennsylvania, 1, 3 Lief., 1897, p. 608, fig. 173.

Retiograptus eucharis Nicholson, Mon. British Grapt., 1872, p. 124, fig. 63.

Glossograptus? *eucharis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 397–400, pl. 26, figs. 18, 19; pl. 27, figs. 11–13, text figs. 346–352.

Diplograptus pristiniiformis Ruedemann, Amer. Jour. Sci., 3d ser., 18, 1895, pp. 453, 455, figs. 2, 3.—Wiman, Bull. Geol. Inst. Upsala, 2, pt. 2, 1895, pp. 69, 71, figs. 2, 3.

Diplograptus ruedemanni Gurley, Jour. Geol., 4, 1896, pp. 298, 307.—Ruedemann, 14th Rep. State Geol. New York for 1894, 1897, p. 219, pl. 1, figs. 2–4, 6–7, 10; pl. 2, figs. 1–4; pl. 5, fig. 1.—Tornquist, Zoolog. Centralbl., 4, 1897, p. 5.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 523 ff.

Diplograptus cf. *aculeatus* Frech, Roemer and Frech, Leth. Pal., 1, 1897, p. 632, pl. A, fig. 2.

Lasiograptus (*Thysanograptus*) *eucharis* Ruedemann, Bull. New York State Mus., 162, 1912, p. 84, figs. 24–28.

Trenton: Lake St. John, etc., Quebec (Collingwood); Vermont; Mohawk and Hudson Valleys, New York (Snake Hill, Canajoharie, and Schenectady).

***Lasiograptus mucronatus* (Hall).**

Graptolithus mucronatus Hall, Pal. New York, 1, 1847, p. 268, pl. 73, figs. 1a–d.

Diplograptus mucronatus Geinitz, Die Graptolithen, 1852, p. 23.—Carruthers, Mem. Geol. Surv., 3, 1866, 330, pl. 11A, fig. 6; pl. 12, fig. 1; *ibid.* 5, 1868, p. 131, pl. 5, fig. 2.—Nicholson, Geol. Mag., 4, 113, pl. 7, figs. 5, 5a; Quart. Jour. Geol. Soc. London, 24, 1868, p. 139.—McCoy, Pal. Victoria, Prodr., dec. 1, 1874, p. 10, pl. 1, fig. 5.—Walcott, Trans. Alb. Inst., 10, 1883 (adv. sheets, 1879, p. 34).—Ami, Can. Geol. Surv. Rep., 2d ser., 3, pt. 2, 1889, p. 117K.—Walcott, Bull. Geol. Soc. Am., 1, 1890, p. 339.—Clark, Geol. Mag., 4th ser., 9, 1902, p. 498.

Diplograptus (*Lasiograptus*) *mucronatus* Lapworth, Belfast Nat. Field Club Ann. Rep., 1, 1877, p. 134, pl. 6.

Lasiograptus mucronatus Lapworth, Proc. and Trans. Roy. Soc. Canada, 4, 1887, 178f.—Gurley, Geol. Surv. Arkansas, Ann. Rep., 3, 1892, p. 413.—Ruedemann Bull. New York State Mus., 42, 1901, p. 544.—Weller, Geol. Surv. New Jersey, Pal., 3, 1902, p. 212, pl. 16, figs. 16, 17.—Dale, Bull. U. S. Geol. Surv., 242, 1904, p. 33.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 479–481, pl. 29, figs. 9–11; pl. 30, figs. 1–5; pl. 31, figs. 1–3; figs. 456, 457.

Chazy (Normanskill): Mt. Moreno, Kenwood, Glenmont, etc., New York; Arkansas; Quebec. Glenkiln shale of Great Britain.

LASIOGRAFTUS MUONONATUS Lapworth. See *Lasiograptus bimucronatus*.

LASIOTHRIX Dawson and Hinde. Genotype: *L. curvicostata* Dawson and Hinde.
Lasiothrix Dawson and Hinde, Trans. Roy. Soc. Canada, 7, sec. 4, 1890, p. 50.—
 Dawson, *ibid.*, 2d ser., 2, sec. 4, 1896, p. 114.—Miller, N. A. Geol. Pal., 1st
 App., 1892, p. 667.

Lasiothrix curvicostata Dawson and Hinde.

Lasiothrix curvicostata Dawson and Hinde, Trans. Roy. Soc. Canada, 7, sec. 4,
 1890, p. 51, fig. 21.—Dawson, *ibid.*, 2d ser., 2, sec. 4, 1896, p. 144, fig. 24.
 Canadian? (Levis?): Metis, Quebec.

Lasiothrix flabellata Dawson and Hinde.

Lasiothrix flabellata Dawson and Hinde, Trans. Roy. Soc. Canada, 7, sec. 4,
 1890, p. 51, fig. 22.—Dawson, *ibid.*, 2d ser., 2, sec. 4, 1896, p. 115, fig. 25.
 Canadian? (Levis?): Metis, Quebec.

LECANOCRINUS Hall.

Genotype: *L. macropetalus* Hall.

Lecanocrinus Hall, Pal. New York, 2, 1852, p. 199.—Pictet, *Traite de Pal.*, 2d ed.,
 4, 1857, p. 319.—Billings, Geol. Surv. Canada, Rep. Progr. for 1853-56, 1857,
 p. 278.—Schultze, Denks. d. Kais. Akad. Wiss., Math.-Naturw., Cl. 26, Abth. 2,
 1867, p. 152, fig. 7.—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Phila-
 delphia, 1879, p. 262 (Rev. Pal., pt. 1, p. 39); *ibid.*, 1890, p. 338.—Beyrich,
 Ann. Mag. Nat. Hist., 4th ser., 7, 1871, p. 404.—Angelin, Icon. Crinoid., 1878,
 p. 11.—Zittel, Handb. Pal., 1, 1879, p. 355.—Miller, N. A. Geol. Pal., 1889,
 p. 257.—Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p.
 147, fig. 54.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1909,
 p. 188.—Wachsmuth, Zittel-Eastman Textb. Pal., 1, 1900, p. 163.—Grabau,
 Bull. New York State Mus., 45, 1901, p. 160; Bull. Buffalo Soc. Nat. Sci., 7,
 1901, p. 160.—Springer, Amer. Geol., 30, 1902, p. 94; Jour. Geol., 14, 1906,
 p. 517.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 564.—Springer,
 Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 203.
Cyrtidocrinus Angelin Icon. Crin. Suec., 1878, p. 20.

LECANOCRINUS CALICULUS Hall. See *Pycnosaccus calyculus*.

LECANOCRINUS ELEGANS Billings. See *Protaxocrinus elegans*.

LECANOCRINUS EXCAVATUS Ringueberg. See *Asaphocrinus ornatus*.

LECANOCRINUS GREENEI Miller and Gurley. See *Anisocrinus greenei*.

Lecanocrinus hemisphericus Rowley.

Lecanocrinus hemisphericus Rowley, Amer. Geol., 34, 1904, p. 271, pl. 14, fig.
 17-19.

Niagaran (Bainbridge): Near St. Mary's, Ste. Genevieve County, Missouri.
 Observation.—Probably the same as *L. pisiformis* (Roemer).

LECANOCRINUS INCISUS Ringueberg. See *Asaphocrinus incisus*.

LECANOCRINUS LEVIS Billings. See *Protaxocrinus laevis*.

Lecanocrinus macropetalus Hall.

Lecanocrinus macropetalus Hall, Pal. New York, 2, 1852, p. 199, pl. 45, figs.
 1a-h.—Emmons, Man. Geology, 1860, p. 63, fig. 42.—Miller, N. A. Geol. Pal.,
 1889, p. 257, fig. 348.—Grabau, Bull. New York State Mus., 45, 1901, p. 160,
 fig. 55; Bull. Buffalo Soc. Nat. Sci., 7, p. 160, fig. 55.—Grabau and Shimer,
 N. A. Index Fossils, 2, 1910, p. 564, fig. 1901, 1902.

Lecanocrinus macropetalus—Continued.

Cyathocrinus? Hall, Geol. 4th Dist. New York, Tab. Org. Rem., No. 21, 1843, figs. 5a-b.

Clinton (Rochester): Lockport, New York.

Lecanocrinus meniscus Springer.

Lecanocrinus meniscus Springer, Mono. Crin. Flex., Smith. Inst. (in press).

Niagaran (Brownsport): Decatur County, Tennessee.

LECANOCRINUS NTIDUS Ringueberg. See *Asaphocrinus ornatus*.

LECANOCRINUS ORNATUS Hall. See *Asaphocrinus ornatus*.

LECANOCRINUS OSWEGOENSIS Miller and Gurley. See *Anisocrinus oswegoensis*.

Lecanocrinus pisiformis (Roemer).

Poteriocrinus pisiformis Roemer, Sil. Fauna West. Tennessee, Breelau, 1860, p. 54, pl. 4, figs. 7a-d.—Shumard, Trans. Acad. Sci. St. Louis, 2, 1866, p. 392.

Arachnocrinus pisiformis Meek and Worthen, Geol. Surv. Illinois, 2, 1866, p. 177 (gen. ref.).—Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, Rev. Pal., pt. 1, 1879, p. 94.—Miller, N. A. Geol. Pal., 1889, p. 224, fig. 248.

Cyathocrinus pisiformis Whitfield, Geol. Wisconsin, 4, 1882, p. 353 (gen. ref.).

Lecanocrinus pisiformis Wachsmuth and Springer, Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 268 (Rev. Pal., pt. 2, 227).

Niagaran: Decatur County, Tennessee (Brownsport); ?Wisconsin (Racine).

Observation.—See also *L. hemisphericus* Rowley.

Lecanocrinus pusillus (Hall).

Cyathocrinus pusillus Hall, Trans. Albany Inst., 4, 1863, p. 200; Prelim. Notice, 18th Rep. New York State Cab. Nat. Hist., 1865, p. 20; 20th Rep. New York State Cab. Nat. Hist., 1868, p. 324, rev. ed., 1870, p. 366; 28th Rep. New York State Mus. Nat. Hist., doc. ed., 1875, 1877, pl. 15, figs. 1-6.

Lecanocrinus pusillus Hall, 28th Rep. New York State Mus. Nat. Hist., mus. ed., 1879, p. 136, pl. 15, figs. 1-6; 11th Ann. Rep. Indiana Dep. Geol. Nat. Hist., 1882, p. 267, pl. 14, figs. 1-6; pl. 15, fig. 7.—Springer, Mono. Crin. Flex., Smith. Inst. (in press).

Lecanocrinus tennesseensis Miller, 17th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1892, p. 651, pl. 7, figs. 7, 8 (adv. sheets, 1891, p. 41).

Niagaran (Waldron): Waldron, Indiana; Newsom, Tennessee.

LECANOCRINUS PUSILLUS Winchell and Marcy. See *Lecanocrinus waukoma*.

Lecanocrinus puteolus Ringueberg.

Lecanocrinus puteolus Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, 1886, p. 11, pl. 1, fig. 8.

Clinton (Rochester): Lockport, New York.

LECANOCRINUS SIMPLEX Hall. See *Ichthyocrinus laevis*.

Lecanocrinus solidus Ringueberg.

Lecanocrinus solidus Ringueberg, Bull. Buffalo Soc. Nat. Hist., 5, 1886, p. 8, pl. 1, fig. 4.

Clinton (Rochester): Lockport, New York.

LECANOCRINUS TENNESSEENSIS Miller. See *Lecanocrinus pusillus*.

Lecanocrinus waukoma (Hall).

Cyathocrinus waukoma Hall, Adv. Pub. 18th Rep. New York State Cab. Nat. Hist., 1865, p. 20, pl. (2), figs. 11, 12; 20th Rep. New York State Cab. Nat. Hist., 1868, p. 324, pl. 11 (2), figs. 11, 12; rev. ed., 1870, p. 367, pl. 11, figs. 11, 12.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 191, fig.

Lecanocrinus waukoma—Continued.

Lecanocrinus waukoma Weller, Bull. Chicago Acad. Sci., Nat. Hist. Surv., 4, pt. 1, 1900, p. 148, pl. 15, figs. 6–11.

Lecanocrinus pusillus Winchell and Marcy (not Hall), Mem. Boston Soc. Nat. Hist., 1, 1865, p. 90.

Niagaran (Racine): Racine and Waukesha, Wisconsin; Bridgeport, Romeo, Lemont, etc., Illinois.

LEDA LEVATA Emmons. See *Ctenodonta levata*.

LEDA PLANA Emmons. See *Lyrodesma planum*.

LEDA PULCHELLA Emmons. See *Ctenodonta pulchella*.

LEIOCLEMA Rominger. See *Lioclema* Ulrich.

LEIOCLEMA FLORIDA Ulrich. See *Nicholsonella florida*.

LEIOCLEMA? *LAMINATUM* Ulrich. See *Fistulipora laminata*.

LEIOCLEMA SINGULARE Ulrich. See *Trematopora? singularis*.

LEIODITIA Ulrich. See *Elpe* Barrande.

LEIOPTERIA Hall.

Genotype: *L. dekayi* Hall.

Leiopteria Hall, Pal. New York, 5, pt. 1, Lam. 1883, p. 4; *ibid.*, 1884, p. 13; 35th Rep. New York State Mus. Nat. Hist., 1884, p. 406; Rep. State Geol. New York, 1884, p. 14.—Whidborne, Mon. Dev. Fauna South England, 2, Pal. Soc., 1892, p. 78.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, 1899, p. 246.—Hind, Mon. British Carb. Lam., 2, Pal. Soc., 1901, p. 9.

Leiopteria Miller, N. A. Geol. Pal., 1889, p. 484.—Clarke, Archivos Mus. Nat. Rio Janeiro, 10, Eng. ed., 1900, p. 48.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 208; Bull. New York State Mus. 45, 1901, p. 208.—Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 424.

Leiopteria rubra Williams.

Leiopteria rubra Williams, Proc. U. S. Nat. Mus., 45, 1913, p. 345, pl. 31, fig. 4. Silurian (Pembroke): Giff's Bay, Washington County, Maine.

Holotype.—Cat. No. 58971, U.S.N.M.

Leiopteria subplana (Hall).

Avicula subplana Hall, Pal. New York, 2, 1852, p. 283, pl. 59, figs. 3a–c.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 823, fig. 628.—Leasey, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 70, fig.

Pterinea subplana Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 52 (gen. ref.).

Pteronites? subplana Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 243, pl. 22, fig. 1.

Leiopteria(?) subplana Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 208, fig. 136; Bull. New York State Mus., 45, 1901, p. 208, fig. 136.

Leiopteria? subplana Grabau and Shimer, N. A. Index Fossils, 1, 1909, p. 424, fig. 554.

Silurian: Lockport, etc. (Rochester-Guelph) and Schoharie Valley, New York (Cobleskill).

?Helderbergian (Keyser): Two miles south Tristates, New York.

LEIOSTEGIUM Raymond.

Genotype: *Bathyrus quadratus* Billings.

Leiostegium Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 68.

***Lelostegium breviceps* (Billings).**

Bathyrus breviceps Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 262, fig. 246.

Lelostegium breviceps Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 69.

Chazyan (Quebec—N): Table Head, Newfoundland.

***Lelostegium quadratum* (Billings).**

Bathyrus quadratus Billings, Canadian Nat. Geol., 5, 1860, p. 321, fig. 27; Geol. Canada, Geol. Surv. Canada, 1863, p. 238, fig. 272; Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 412, fig. 396.

Lelostegium quadratum Raymond, Bull. Victoria Memorial Mus., 1, 1913, p. 68, pl. 7, fig. 17.

Canadian (Levis-Limestone): Point Levis, Quebec.

***LEJOPYGE* Hawle and Corda.**

Genotype: *Battus laevigatus* Hisinger.

Lejopyge Hawle and Corda Abh. böhm. Gesell. Wiss., 5, 1847, p. 51, pl. 3, fig. 25.

***Lejopyge cyclopyge*? (Tullberg).**

Agnostus cyclopyge Tullberg, Sveriges Geol. Undersök., ser. O, No. 42, 1880, p. 26, pl. 2, fig. 15.

Agnostus cf. *cyclopyge* Matthew, Geol. Surv. Canada, Rep. Camb. Rocks C. Breton, 1903, p. 222.

Canadian (Bretonian—Div. C3b): East Bay, east of Bras d'Or Lake, Cape Breton, Nova Scotia. Lower Ordovician of Europe.

LEPADOCRINUS* Cumings. See *Lepadocystis* Carpenter.**LEPADOCRINUS* Hall (part). See *Lepocrinites* Conrad and *Apiocystites* Forbes.*****LEPADOCRINUS MOOREI* Cumings. See *Lepadocystis moorei*.*****LEPADOCYSTIS* Carpenter.**

Genotype: *Lepocrinites moorei* Meek.

Lepadocystis Carpenter, Linn. Soc. Jour. Zool., 24, 1891, p. 10.—Bather, Treatise on Zoology, pt. 3, Echinoderma, 1900, p. 61.—Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 458.

Lepadocrinus Zittel (part), Handb. Pal., 1, 1879, p. 421.—Miller (part), N. A. Geol. Pal., 1889, p. 257.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 714.

Meekocystis Jaekel, Stammesges. Pemat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 277. (Genotype: *Lepocrinites moorei* Meek.)

LEPADOCYSTIS CLINTONENSIS* Parks. See *Brockocystis clintonensis*.**Lepadocystis moorei* (Meek).**

Lepocrinites moorei Meek, Amer. Jour. Sci., 3d ser., 2, 1871, p. 296; Geol. Surv. Ohio, Pal., 1, 1873, p. 39, pl. 3, figs. 4a-c.

Lepadocystis moorei Carpenter, Linn. Soc. Jour. Zool., 24, 1891, 10.—Bather, Treatise on Zool., pt. 3, Echinoderma, London, 1900, p. 61, fig. 28.—Foerste, Bull. Sci. Lab. Denison Univ., 17, 1914, p. 459, pl. 5, fig. 1.

Meekocystis moorei Jaekel, Stammes. Pemat., 1, Thecoidea u. Cystoidea, Berlin, 1899, p. 278, fig. 58, p. 279.

Lepadocrinus moorei Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 727, pl. 4, figs. 6-6b.

Richmond (Whitewater): Richmond, Indiana.

LEPERDITELLA Ulrich.Genotype: *Leperditia inflata* Ulrich.*Leperditia* (part) Ulrich, Amer. Geol., 10, 1892, p. 263.*Leperditella* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 636; Zittel-Eastman Textb. Pal., 1, 1900, p. 643.—Bassler, *ibid.*, 2d ed., 1913, p. 737.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 339.**Leperditella squilatera** (Ulrich).*Leperditia squilatera* Ulrich, Amer. Geol., 10, 1892, p. 265, pl. 9, figs. 9-11.*Leperditella squilatera* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 636, fig. 46c.

Stones River (Ridley): Bottom of gorge at High Bridge, Kentucky.

Holotype: Cat. No. 41312, U.S.N.M.**Leperditella canalis** Ulrich.*Leperditella canalis* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 637, pl. 43, figs. 1-3.*Leperditia canalis* Miller, N. A. Geol. Pal., 2d App., 1897, p. 788.

Black River (Platteville): Minneapolis and near Cannon Falls, Minnesota.

Holotype.—Cat. No. 41304, U.S.N.M.**LEPERDITELLA? DORSICORNIS** Ulrich. See *Primitia dorsicornis*.**Leperditella germana** (Ulrich).*Leperditia germana* Ulrich, Amer. Geol., 10, 1892, p. 266, pl. 9, figs. 16-18.*Leperditella germana* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, pp. 636, 638, pl. 45, figs. 24-26.

Black River (Platteville): Mineral Point, Wisconsin.

Holotype.—Cat. No. 41307, U.S.N.M.**Leperditella? glabra** (Ulrich).*Primitia glabra* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1890, p. 134, pl. 10, figs. 9a-9c.*Leperditella? glabra* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 639.

Richmond (Whitewater): Oxford and Blanchester, Ohio; Richmond, Indiana.

Holotype.—Cat. No. 41827, U.S.N.M.**Leperditella inflata** (Ulrich).*Leperditia inflata* Ulrich, Amer. Geol., 10, 1892, p. 265, pl. 9, figs. 12-15.*Leperditella inflata* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 636, figs. 46a-46d.—

Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 339, fig. 1656a-c.

Stones River (Ridley): Bottom of gorge at High Bridge, Kentucky.

Cotypes.—Cat. No. 41311, U.S.N.M.**Leperditella? labellosa** (Jones).*Isoschilina labellosa* Jones, Cont. Canadian Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 69, pl. 10, figs. 16a-c, 17, 19.*Leperditella? labellosa* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 637.

Stones River (Pamelia): Aylmer, Quebec; Gloucester, Carleton County, Ontario.

Leperditella macra Ulrich.*Leperditella macra* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 638, pl. 43, figs. 7-9.*Leperditia macra* Miller, N. A. Geol. Pal., 2d App., 1897, p. 788 (gen. ref.).

Black River (Decorah): Minneapolis, Minnesota.

Holotype.—Cat. No. 41306, U.S.N.M.**Leperditella mundula** (Ulrich).*Leperditia mundula* Ulrich, Amer. Geol., 10, 1892, p. 265, pl. 9, figs. 4-8.*Leperditella mundula* Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 636, fig. 46e-46h.

Stones River (Ridley): Bottom of gorge at High Bridge, Kentucky.

Cotypes.—Cat. No. 41309, U.S.N.M.

***Leperditella? obscura* (Jones).**

Leperditia? obscura Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 71, pl. 10, figs. 15a-c.

Leperditella? obscura Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 637.
Trenton: Falls of Lorette, Quebec.

***Leperditella ornata* Weller.**

Leperditella ornata Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 209, pl. 13, figs. 13-15.

Trenton: Near Iliff's Pond, two miles southeast of Newton, New Jersey.

***Leperditella persimilis* Ulrich.**

Leperditella persimilis Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 637, pl. 43, figs. 4-6.

Leperditia persimilis Miller, N. A. Geol. Pal., 2d App., 1897, p. 788 (gen. ref.).

Black River (Decorah): Minneapolis, Minnesota.

Holotype.—Cat. No. 41308, U.S.N.M.

***Leperditella sulcata* (Ulrich).**

Leperditia sulcata Ulrich, Amer. Geol., 10, 1892, p. 266, pl. 9, figs. 19-21.

Leperditella sulcata Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 636, fig. 46j.—

Basler, Bull. Virginia Geol. Surv., 2a, 1909, pl. 23, fig. 14.

Black River (Lowville): High Bridge, Kentucky; Tennessee; Virginia.

Holotype.—Cat. No. 41313, U.S.N.M.

***Leperditella sulcata ventricornis* Ulrich.**

Leperditella sulcata var. *ventricornis* Ulrich, Amer. Geol., 10, 1892, p. 266, pl. 9, figs. 22, 23; Geol. Minnesota, 3, pt. 2, 1894, p. 636, fig. 46k.

Black River (Lowville): High Bridge, Kentucky.

Holotype.—Cat. No. 41314, U.S.N.M.

***Leperditella tumida* (Ulrich).**

Leperditia tumida Ulrich, Amer. Geol., 10, 1892, p. 264, pl. 9, figs. 1-3.

Leperditella tumida Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 636.—Basler, Bull. Virginia Geol. Surv., 2a, 1909, pl. 23, fig. 13.

Black River (Lowville): High Bridge, Kentucky; Tennessee; Virginia.

Holotype.—Cat. No. 41310, U.S.N.M.

LEPERDITIA Rousault.

Genotype: *L. brittanica* Rousault.

Leperditia Rousault, Bull. Soc. Geol. France, 2d ser., 8, 1851, p. 377.—Jones, Ann.

Mag. Nat. Hist., 2d ser., 1856, p. 84; Monthly Microsc. Jour., 4, 1870, pp.

188-190.—Barrande, Syst. Sil. du Centre Boheme, 1 Suppl., 1872, p. 523.—

Schmidt, Mem. l'Acad. Imp. Sci. St. Petersburg, 21, 1873.—Miller, Cincin-

nati Quart. Jour. Sci., 1, 1874, p. 121.—Alth, Anhandl. geol. Reichsanstalt, 7,

Heft 1, 1874, p. 66.—Nicholson and Lydecker, Man. Pal., 1, 1879, p. 506.—

Jones, Ann. Mag. Nat. Hist., 5th ser., 8, 1881, p. 334.—Schmidt, Mem. l'Acad.

Imp. Sci. St. Petersburg, 31, 1883.—Vine, Proc. Yorkshire Geol. Polytechnic Soc.,

n. s., 8, 1884, p. 234.—Zittel, Handb. Pal., 2, 1885, p. 551.—Jones and Kirkby,

Proc. Geol. Assoc., 9, 1887, p. 503.—Nicholson and Lydecker, Man. Pal., 1,

1879, p. 506.—Miller, N. A. Geol. Pal., 1889, p. 552.—Vogdes, Ann. New

York Acad. Sci., 5, 1889, p. 23, pl. 2, fig. 17.—Miller, N. A. Geol. Pal., 1st

App., 1892, p. 708.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 633.—Koken,

Die Leitfossilien, 1896, p. 40.—Grabau, Bull. Buffalo Soc. Nat. Sci., 6, p. 307;

ibid., 7, 1901, p. 218.—Ulrich, Zittel's Textb. Pal. (Amer. ed.), 1900, p.

643.—Grabau, Bull. New York State Mus., 45, 1901, p. 218.—Cumings, 32d

Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1041.—Grabau and Shimer,

N. A. Index Fossils, 2, 1910, p. 339.—Basler, Zittel-Eastman Textb. Pal.,

2d ed., 1913, p. 737.

LEPERDITIA AEQUILATERA Ulrich. See *Leperditella aequilatera*.

Leperditia alta (Conrad).

Cytherina alta Conrad in Vanuxem, Nat. Hist. New York, Geol., 3, 1842, p. 112, fig. 6.—Mather, Geol., New York, 1, 1843, p. 349, fig. 6.—Hall, *ibid.*, 4, 1843, p. 142, fig. 6; tab. ill. 26, fig. 6.—Owen, Amer. Jour. Sci. Arts, 2d ser., 1, 1846, p. 47, fig. 6.—Emmons, Man. Geol., 1860, p. 113, fig. 102.—Linckhous, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 58, pl. 9, fig. 6.

Leperditia alta Jones, Ann. Mag. Nat. Hist., 2d ser., 17, 1856, p. 88, pl. 7, figs. 6, 7; *ibid.*, 3d ser., 1, 1858, p. 250, pl. 10, figs. 8, 9; Geol. Surv. Canada, dec. 3, p. 95.—Hall, Pal. New York, 3, 1859, p. 373, pl. 79a, figs. 6a-e.—Emerson(?) Narrative Hall's Sec. Arctic Exped., U. S. Navy Dep., 1879, p. 579, fig. 5.—Jones, Ann. Mag. Nat. Hist., 5th ser., 8, 1881, p. 345.—Whitfield, Geol. Wisconsin, 4, 1882, p. 323, pl. 25, figs. 8, 9.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 198, fig.—Jones, Ann. Mag. Nat. Hist., 5th ser., 14, 1884, p. 342; Quart. Jour. Geol. Soc. London, 44, 1890, p. 25, pl. 1, figs. 6a, b; Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 84, pl. 13, figs. 10, 11.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, pp. 259, 265, pl. 24, figs. 25-28.—Grabau, Bull. New York State Mus., 92, 1906, p. 115, fig. 24a.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 341.

Oayugan and Helderbergian: Manlius, etc., New York; New Jersey; etc.

LEPERDITIA ALTA Whitfield (1891). See *Leperditia ohioensis*.

Leperditia altoides Weller.

Leperditia altoides Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 252, pl. 23, figs. 1, 2.—Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 513, pl. 97, figs. 8, 9.

Helderbergian: Flatbrookville, New Jersey (Rondout); Devil's Backbone, near Cumberland and Tonoloway, Maryland (Keyser).

LEPERDITIA ALTOIDES Grabau. See *Leperditia ohioensis*.

Leperditia amygdalina Jones.

Leperditia amygdalina Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 341; Geol. Surv. Canada, dec. 3, 1858, p. 97, pl. 11, figs. 18, 19; Ann. Mag. Nat. Hist., 5th ser., 8, 1881, p. 344, pl. 19, fig. 9; *ibid.*, 14, p. 342; Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, pp. 98, 99.

Stones River (Pamelia): Near L'Original, Canada.

Leperditia angulifera Whitfield.

Leperditia angulifera Whitfield, Ann. New York Acad. Sci., 2, 1882, p. 197; *ibid.*, 5, 518, pl. 5, figs. 28-30; Geol. Surv. Ohio, Pal., 7, 1893, p. 418, pl. 1, figs. 28-30.—Sherzer, Geol. Surv. Michigan, 7, pt. 1, 1900, pl. 17, figs. 28-30.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 340, fig. 1654.—Grabau, Michigan Geol. Surv., Geol., 1st ser., 1909, p. 203, pl. 30, figs. 28-30.

Lower Monroan (Greenfield): Greenfield, Ohio.

Leperditia anna Jones.

Leperditia anna Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 247, pl. 9, fig. 18; Geol. Surv. Canada, dec. 3, 1858, p. 96, pl. 11, fig. 13; Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, pp. 98, 99.

Canadian (Beekmantown): St. Anne, Canada.

Leperditia anticostiana (Jones).

Leperditia Canadensis var. *Anticostiana* Jones, Geol. Surv. Canada, dec. 3, 1858, p. 95, pl. 11, fig. 17.

Leperditia anticostiana—Continued.

Leperditia fabulites var. *anticostiana* Jones, Ann. Mag. Nat. Hist., 5th ser., 8, 1881, p. 344, pl. 19, fig. 8.

Leperditia Anticostiana Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 66.—Jones, Ann. Mag. Nat. Hist., 5th ser., 14, 1884, p. 341.—Dwight, Trans. Vassar Bros. Inst., 5, 1890, p. 76.

Leperditia Anticostiensis Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, pp. 98, 99.

Anticostian (Jupiter River): East Point and Jumpers, Anticosti.

LEPERDITIA ANTICOSTIENSIS Jones. See *Leperditia anticostiana*.

Leperditia appressa Ulrich.

Leperditia appressa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 176, pl. 11, figs. 5a-d.

Trenton (Perryville): Danville and Harrodsburg, Kentucky.

Cotypes.—Cat. Nos. 41281, 41282, U.S.N.M.

Leperditia arctica (Jones).

Leperditia baltica var. *arctica* Jones, in Salter Sutherland's Jour. Voyage in Baffin's Bay, etc., 2, App., 1852, p. 221, pl. 5, fig. 13; *ibid.*, Quart. Jour. Geol. Soc. London, 9, 1853, p. 314.

Leperditia arctica Jones, Ann. Mag. Nat. Hist., 2d ser., 17, 1856, p. 87, pl. 7, figs. 1-5.

Niagaran: Cape Hotham, Assistance Bay, Seal Island, Baring Bay, etc., Arctic America.

LEPERDITIA (ISOCHILINA) ARMATA Walcott. See *Isochilina armata*.

LEPERDITIA BALTHICA var. *b.* Kolmodin. See *Leperditia hisingeri*.

Leperditia balthica guelphica Jones.

Leperditia balthica var. *guelphica* Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 80, pl. 13, figs. 12a, b, 13a-c.—Whiteaves, Geol. Surv. Canada, Pal. Foss., 3, pt. 2, 1895, p. 106 (loc. occ.).—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 106, pl. 21, figs. 9-11.

Niagaran (Guelph): Durham and Aboyne, Ontario; Rochester, New York.

Leperditia balthica primæva Jones.

Leperditia balthica var. *primæva* Jones, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 70, pl. 10, fig. 18.

Stones River (Pamelia): Carleton County, Ontario.

LEPERDITIA BALTICA var. *ARCTICA* Jones. See *Leperditia arctica*.

LEPERDITIA BILLINGSI Jones. See *Aparchites billingsi*.

LEPERDITIA BIVERTEX Ulrich. See *Ulrichia bivertex*.

Leperditia bivia White.

Leperditia bivia White, Rep. U. S. Geogr. Surv. West 100th Merid., 4, 1877, p. 58, pl. 3, figs. 7a-d (Prelim. Rep. 1874, p. 11).—Walcott, U. S. Geol. Surv., Mon. 8, 1884, p. 88.

Upper Pogonip: Queen Spring Hill, Schell Creek Range, Nevada.

Cotypes.—Cat. No. 17411, U.S.N.M.

LEPERDITIA BYRNESI Miller. See *Dicranella? byrnesi*.

***Leperditia caeca* Jones.**

Leperditia caeca Jones, Contr. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 88, pl. 12, figs. 6, 7, 9.

Niagaran: Saskatchewan River, Canada.

***Leperditia caecigena* Miller.**

Leperditia caecigena Miller, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 263, pl. 6, figs. 5, 5a.—Ulrich, *ibid.*, 1891, p. 176, pl. 11, figs. 6a-d.—Miller, N. A. Geol. Pal., 1889, p. 552, fig. 1021.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1047, pl. 53, fig. 10-10c.—Grabau and Shimer, N. A. Ind. Fossils, 2, 1910, p. 340, fig. 1656d, e.

Richmond (Whitewater-Saluda): Versailles, Madison, etc., Indiana.

Pleriotypes.—Cat. No. 41276, U.S.N.M.

***Leperditia caecigena frankfortensis* Ulrich.**

Leperditia caecigena var. *frankfortensis* Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 277.

Trenton (Perryville): Reservoir Hill, Frankfort, Kentucky.

Cotypes.—Cat. No. 41279, U.S.N.M.

***LEPERDITIA CANADENSIS* Jones (part).** See *Leperditia nana* and *L. canadensis, louckiana*.

***Leperditia canadensis* Jones.**

Leperditia Canadensis Jones (part), Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 244, pl. 9, figs. 11-15.—Chapman, Canadian Jour., n. s., 8, 1863, p. 195, fig. 15; Expos. Min. Geol. Canada, 1864, p. 167, fig. 163.—Billings, Cat. Sil. Foss. Anticosti, Geol. Surv. Canada, 1866, p. 28 (loc. occ.).—Emerson(?), Narrative Hall's Sec. Arctic Exped., U. S. Navy Dep., 1879, p. 580, fig. 6.—Jones, Ann. Mag. Nat. Hist., 5th ser., 14, 1881, p. 340.—Dwight, Trans. Vassar Bros. Inst. 5, 1890, p. 76.—Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, pp. 97, 99.

Canadian (Beekmantown): Grenville, etc., Quebec.

***LEPERDITIA CANADENSIS* var. *ANTICOSTIANA* Jones.** See *Leperditia anticostiana*.

***LEPERDITIA CANADENSIS* var. *JOSEPHIANA* Jones.** See *Leperditia fabulites*.

***Leperditia canadensis labrosa* Jones.**

Leperditia Canadensis var. *labrosa* Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 245, pl. 9, fig. 13; Geol. Surv. Canada, 3, 1858, p. 93, pl. 11, fig. 8; Ann. Mag. Nat. Hist., 5th ser., 8, 1881, p. 343; Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, pp. 97, 99.

Chazy (Aylmer): Hawkesbury, Ontario.

***Leperditia canadensis louckiana* Jones.**

Leperditia Canadensis var. *Louckiana* Jones, Geol. Surv. Canada, dec. 3, 1858, p. 93, pl. 11, fig. 11; Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, pp. 97, 99.

Leperditia canadensis? Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 245, pl. 9, figs. 16, 17.

Leperditia fabulites var. *louckiana* Jones, Ann. Mag. Nat. Hist., 5th ser., 8, 1881, p. 343.

Leperditia louckiana Jones, Ann. Mag. Nat. Hist., 5th ser., 14, 1884, p. 340.—Dwight, Vassar Bros. Inst., 5, 1890, p. 76 (loc. occ.).

Trenton: Loucks Mill, Castor River, Canada.

LEPERDITIA CANADENSIS var. **NANA** Jones. See *Leperditia nana*.

Leperditia canadensis pauquettiana Jones.

Leperditia Canadensis var. *Pauquettiana* Jones, Geol. Surv. Canada, dec. 3, 1858, p. 94, pl. 11, fig. 12; Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, pp. 97, 99.

Leperditia fabulites var. *pauquettiana* Jones, Ann. Mag. Nat. Hist., 5th ser., 8, 1881, p. 343.

Black River (Leray): Pauquette's Rapids, Allumette Island, Ottawa River, Canada.

LEPERDITIA CANALIS Miller. See *Leperditella canalis*.

Leperditia capax Safford.

Leperditia capax Safford, Geol. Tennessee, 1869, p. 290 (nom. nud.).
Trenton: Nashville, Tennessee.

LEPERDITIA CLAYPOLEI Jones. See *Primitiella claypolei*.

Leperditia concinnula Billings.

Leperditia concinnula Billings, Geol. Surv. Canada, Pal. Foss., 1, 1865, p. 299.
Chazyan (Quebec-L, M): Point Rich and Table Head, Newfoundland.

LEPERDITIA CREPIFORMIS Ulrich. See *Jonesella crepidiformis*.

Leperditia cylindrica (Hall).

Cytherina cylindrica Hall, Pal. New York, 2, 1852, p. 14, pl. 4, figs. 8a, b.

Leperditia (*Isochilina*) *cylindrica* Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 253.

Leperditia cylindrica Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 80 (gen. ref.).—Jones, Ann. Mag. Nat. Hist., 5th ser., 14, 1884, p. 344.

Isochilina cylindrica Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 218; Bull. New York State Mus., 45, 1901, p. 218.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 342.

Upper Medinan: Medina, Lockport, etc., New York.

LEPERDITIA (ISOCHILINA) CYLINDRICA Hall. See *Bythocypris cylindrica*.

LEPERDITIA (?PRIMITIA) DORSICORNIS Ulrich. See *Primitia dorsicornis*.

Leperditia elongata Weller.

Leperditia elongata Weller, Geol. Surv. New Jersey, Rep. Pal., 3, 1903, p. 259, pl. 23, fig. 13.—Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 514, pl. 97, fig. 11.

Helderbergian: Two miles south of Tristates, New York (Rondout); Tonoloway, Maryland (Keyser).

Leperditia faba Hall.

Leperditia faba Hall, 28th Rep. New York State Mus., doc. ed., 1875, pl. 32, figs. 1-3; mus. ed., p. 186, pl. 32, figs. 1-3; 11th Ann. Rep. Indiana Dep. Geol.

Nat. Hist., 1882, p. 331, pl. 34, figs. 1-3.

Niagaran (Waldron): Waldron, Indiana.

Leperditia fabulites (Conrad).

Cytherina sp. Hall, Pal. New York, 1, 1847, p. 44, pl. 10, fig. 12.

Cytherina fabulites Conrad, Proc. Acad. Nat. Sci. Philadelphia, 1, 1843, p. 332.

Leperditia fabulites Jones, Ann. Mag. Nat. Hist., 2d ser., 17, 1856, p. 89; *ibid.*, 3d ser., 1, 1858, p. 341; *ibid.*, 5th ser., 8, 1881, p. 342, pl. 20, fig. 4; *ibid.*, 5th ser., 14, 1884, p. 342.—Chamberlin, Geol. Wisconsin, 1, 1883, p. 160, fig.—

Leperditia fabulites—Continued.

- Dwight, Trans. Vassar Bros. Inst., 5, 1890, p. 76.—Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 173, pl. 11, figs. 1a, d, 2.—Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, p. 98, 99.—Ulrich, Geol. Minnesota, 3, pt. 2, 1894, p. 634, pl. 43, figs. 10–14.—Ruedemann, Bull. New York State Mus., 49, 1902, p. 70, pl. 5, figs. 19, 20.—Weller, Geol. Surv. New Jersey, Pal. 3, 1903, p. 208, pl. 13, figs. 11, 12.—Ulrich and Bassler, Proc. U. S. Nat. Mus., 35, 1908, p. 282, fig. 1.—Bassler, Bull. Virginia Geol. Surv., 2a, 1908, pl. 3, figs. 3–7.—Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 340, fig. 1653.
- Leperditia canadensis* var. *josephiana* Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 341; Geol. Surv. Canada, dec. 3, 1858, p. 94, pl. 11, fig. 16.
- Leperditia fabulites josephiana* Jones, Ann. Mag. Nat. Hist., 5th ser., 1881, p. 34, pl. 19, fig. 7; pl. 20, figs. 7, 8.
- Leperditia josephiana* Jones, Ann. Mag. Nat. Hist., 5th ser., 14, 1884, p. 341; Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 97 (loc. occ.).—Dwight, Trans. Vassar Bros. Inst., 5, 1890, p. 76 (loc. occ.).
- Black River: Mineral Point, etc., Wisconsin; Minnesota; New York; Canada; etc.
- Stones River: Tennessee, etc.
- Plesiotypes*.—Cat. Nos. 41263, 41267, U.S.N.M. (Ulrich).

LEPERDITIA FABULITES VAR. **ANTICOSTIANA** Jones. See *Leperditia anticostiana*.

LEPERDITIA FABULITES VAR. **JOSEPHIANA** Jones. See *Leperditia fabulites*.

LEPERDITIA FABULITES VAR. **LOUCKIANA** Jones. See *Leperditia canadensis* var. *louckiana*.

LEPERDITIA FABULITES VAR. **PAUQUETTIANA** Jones. See *Leperditia canadensis* var. *pauquettiana*.

LEPERDITIA FIMBRIATA Ulrich. See *Aparchites fimbriatus*.

Leperditia fonticola Hall.

- Leperditia fonticola* Hall, 20th Rep. New York State Cab. Nat. Hist., 1868, p. 335, pl. 21 (12), figs. 1–3; rev. ed., 1870, p. 428, pl. 21, figs. 1–3.
- Niagaran (Byron): Fond du Lac, Wisconsin.

Leperditia frontalis Jones.

- Leperditia frontalis* Jones, Quart. Jour. Geol. Soc. London, 46, 1890, p. 547, pl. 21, figs. 8a, 8b.
- Anticostian (Jupiter River): Near The Jumpers, Anticosti.

LEPERDITIA GERMANA Ulrich. See *Leperditella germana*.

Leperditia gibbera Jones.

- Leperditia gibbera* Jones, Ann. Mag. Nat. Hist., 2d ser., 17, 1856, p. 90, pl. 7, figs. 8–10.
- Niagaran: Beechy Island, Lancaster Sound, Arctic America.

LEPERDITIA GIBBERA VAR. **SCALARIS** Jones. See *Leperditia scalaris*.

Leperditia gigantea Weller.

- Leperditia gigantea* Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 260, pl. 23, fig. 14.—Ulrich and Bassler, Maryland Geol. Surv., Low. Dev., 1913, p. 514, pl. 97, fig. 10.
- Helderbergian: Two miles south of Tristates, New York (Rondout); Tonoloway, Maryland (Keyser).

LEPERDITIA (ISOCHILINA) GRACILIS Jones. See *Isochilina gracilis*.

LEPERDITIA GRANILABIATA Ulrich. See *Aparchites granilabiatu*s.

Leperditia hisingeri Schmidt.

Cytherina balthica (part) Hisinger, Leth. Suecica, 1837, p. 10, pl. 30, fig. 1.

Cythere baltica Roemer, Bronn's Leth. Geogn., 2, 1854, p. 528 (part), pl. 9, fig. 8a-c.

Leperditia balthica (part) Jones, Ann. Mag. Nat. Hist., 2d ser., 17, 1856, p. 85, pl. 6, figs. 3a-e; *ibid.*, 5th ser., 8, 1881, p. 333, pl. 19, figs. 10, 11.

Leperditia balthica var. b. Kolmodin, Bidrag till Kannedomen om Sveriges Silurika Ostracoder, 1869, p. 14, figs. 4, 5.

Leperditia hisingeri Schmidt, Mem. Acad. Imp. Sci. St. Petersburg, 7th ser., 21, 1873, p. 16, fig. 23; *ibid.*, 31, 1883, p. 14, pl. 5, figs. 5-7.—Jones, Geol. Surv. Canada, Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 82, pl. 13, figs. 1, 9.—Krause, Zeits. d. d. geol. Gesell., 43, 1891, p. 489, pl. 29, fig. 4.

Leperditia schmidtii Kolmodin, Ofvers. Vet.-Akad. Forh., 36, 1880, p. 133.

Silurian: Europe; Long Point, Lake Winnipegosis, Grand Rapids, Saskatchewan River, and Beechy Island, Lancaster Sound, Canada.

Leperditia hisingeri egana Jones.

Leperditia Hisingeri var. *egana* Jones, Geol. Surv. Canada, Contr. Micro.-Pal., pt. 3, 1891, p. 82, pl. 12, fig. 8.

Niagaran: Grand Rapids, Saskatchewan River, Canada.

Leperditia hisingeri fabulina Jones.

Leperditia Hisingeri var. *fabulina* Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, p. 82, pl. 10, figs. 5, 7; pl. 12, fig. 15; pl. 13, figs. 2, 3, 5, 6.

Niagaran: Long Point, Lake Winnipegosis, and foot of Grand Rapids, Saskatchewan River, Canada.

Leperditia hisingeri gibbera Jones.

Leperditia Hisingeri var. *gibbera* Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, p. 82, pl. 13, fig. 4.

Niagaran: Long Point, Lake Winnipegosis, Canada.

Leperditia illinoisensis Savage.

Leperditia illinoisensis Savage, Bull. Geol. Surv. Illinois, 23, 1913, p. 123, pl. 7, fig. 27.

Upper Medinan (Channahon): Will County, Illinois.

LEPERDITIA INFLATA Ulrich. See *Leperditella inflata*.

Leperditia jonesi Hall.

Leperditia jonesi Hall, Pal. New York, 3, 1859, p. 372; 12th Rep. New York State Cab. Nat. Hist., 1859, p. 80.—Jones, Ann. Mag. Nat. Hist., 5th ser., 14, 1884, p. 342.—Schuchert, Amer. Geol., 31, 1903, p. 169.

Cytherina alta? Conrad, Hall, Pal. New York, 2, 1852, p. 338, pl. 78, figs. 2a-d.

Cayugan (Cobleskill): Schoharie, New York.

LEPERDITIA JOSEPHIANA Jones. See *Leperditia fabulites*.

Leperditia limatula Raymond.

Leperditia limatula Raymond, Amer. Jour. Sci., 4th ser., 20, 1905, p. 380; Ann. Carnegie Mus., 7, 1911, p. 253, fig. 25.

Chazy: Valcour Island, Valcour and Chazy, New York (Crown Point); East Tennessee (Lenoir).

***Leperditia linneyi* Ulrich.**

Leperditia linneyi Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 174, pl. 11, figs. 3a-3e.

Trenton (Perryville): Harrodsburg, Frankfort, etc., Kentucky.

Cotypes.—Cat. No. 41272, U.S.N.M.

LEPERDITIA LOUCKIANA Jones. See *Leperditia canadensis louckiana*.

LEPERDITIA MACRA Miller. See *Leperditella macra*.

***Leperditia marginata* Schmidt.**

Leperditia marginata Schmidt, Mem. Imp. Acad. Sci. St. Petersburg, 7th ser., 21, 1873, p. 19, pl., fig. 29; *ibid.*, 31, 1883, p. 18, pl. 1, figs. 13-19.—Jones,

Cont. Micro-Pal., Geol. Surv. Canada, pt. 3, 1891, p. 86, pl. 10, figs. 6a-c.

Silurian: Russia; east side of Lake Winnipegosis, Canada.

LEPERDITIA MARGINATA Jones. See *Isochilina grandis* and *I. grandis latimarginata*.

LEPERDITIA MILLEPUNCTATA Ulrich. See *Aparachites millepunctata*.

LEPERDITIA (ISOCHILINA) MINUTISSIMA Hall. See *Aparchites minutissimus*.

***Leperditia morgani* Safford.**

Leperditia Morgani Safford, Geol. Tennessee, 1869, p. 290 (nom. nud.)

Trenton: Nashville, Tennessee.

LEPERDITIA MUNDULA Ulrich. See *Leperditella mundula*.

***Leperditia nana* (Jones).**

Leperditia canadensis Jones (part), Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 244; Contr. to Canadian Micro-Pal., 1891, p. 97.

Leperditia canadensis var. *nana* Jones, Geol. Surv. Canada, dec. 3, 1858, p. 92, pl. 2, figs. 6, 7, 9, 10; Ann. Mag. Nat. Hist., 5th ser., 8, p. 343.

Leperditia nana Raymond, Ann. Carnegie Mus., 7, 1911, p. 254.

Canadian (Beekmantown): Grenville, Quebec.

?Chazyan: Valcour Island, Crown Point, etc., New York.

LEPERDITIA? OBSCURA Jones. See *Leperditella obscura*.

***Leperditia ohioensis* Bassler (new name).**

Leperditia alta Whitfield (not Conrad), Ann. New York Acad. Sci., 5, 1891, p. 517, pl. 5, fig. 27; Geol. Surv. Ohio, Pal., 7, 1893, pp. 417-418, pl. 1, fig. 27.—

Meek, Geol. Surv. Ohio, Pal., 1, 1873, p. 187, pl. 17, figs. 2a, b.

Leperditia altoides Grabau (not Weller), Michigan Geol. Surv., Geol. Ser., 1, 1909, p. 205, pl. 30, fig. 27.

Lower Monroan (Greenfield): Greenfield and Ballville, Ohio.

LEPERDITIA (ISOCHILINA) OTTAWA Jones. See *Isochilina ottawa*.

***Leperditia ovata* Jones.**

Leperditia ovata Jones, Ann. Mag. Nat. Hist., 3d ser., 1, 1858, p. 252, pl. 10, fig. 14; Geol. Pennsylvania, 2, pt. 2, 1858, p. 834, fig. 697.

Trenton: Potter's Fort, Penns Valley, Pennsylvania.

***Leperditia parvula* Hall.**

Not recognized.

Leperditia parvula Hall, Pal. New York, 3, 1859, p. 376.

Tentaculite limestone: Herkimer County, New York.

Leperditia pennsylvanica Jones.

Leperditia Pennsylvanica Jones, *Ann. Mag. Nat. Hist.*, 3d ser., 1, 1858, p. 251, pl. 10, figs. 12, 13.—Rogers, *Geol. Pennsylvania*, 2, pt. 2, 1858, p. 834, fig. 699.
Clinton: Near Barre Forge, Pennsylvania.

LEPERDITIA PERSIMILIS Miller. See *Leperditella persimilis*.**Leperditia phaseolus** (Hisinger).

Cytherina phaseolus Hisinger, *Leth. Sues.*, 1837, p. 9, pl. 1, fig. 1.
Leperditia phaseolus Jones, *Contr. Canadian Micro-Pal.*, 3, 1891, p. 85, pl. 13, figs. 7, 8.
Silurian: Europe; Saskatchewan River, at Roche Rouge, Canada.

Leperditia phaseolus guelfhica Jones.

Leperditia phaseolus var. *guelfhica* Jones, *Cont. Micro-Pal.*, *Geol. Surv. Canada*, pt. 3, 1891, p. 86, fig. 5.—Whiteaves, *Geol. Surv. Canada*, *Pal. Foss.*, 3, pt. 2, 1895, p. 106 (loc. occ.).
Niagaran (Guelph): Durham, Ontario.

LEPERDITIA RADIATA Ulrich. See *Elpe radiata*.**Leperditia resplendens** Ruedemann.

Leperditia resplendens Ruedemann, *Bull. New York State Mus.*, 49, 1901, p. 71, pl. 5, figs. 21-27.
Mohawkian (Rysedorph): Rysedorph Hill, Rensselaer County, New York.

Leperditia scalaris (Jones).

Leperditia gibbera var. *scalaris* Jones, *Ann. Mag. Nat. Hist.*, 3d ser., 1, 1858, p. 250, pl. 10, figs. 10, 11.—Rogers, *Geol. Pennsylvania*, 2, pt. 2, 1858, p. 834, fig. 698.
Leperditia scalaris Grabau, *Bull. Geol. Soc. Amer.*, 11, 1900, p. 371, pl. 22, figs. 6a-d; *Bull. Buffalo Soc. Nat. Sci.*, 7, 1901, p. 219, fig. 150; *Bull. New York State Mus.*, 45, 1901, p. 219, fig. 150; *ibid.*, *Bull.* 92, 1906, p. 111; *Michigan Geol. Surv.*, *Geol.*, 1st ser., 1909, p. 202, pl. 32, fig. 6a-d.—Grabau and Shimer, *N. A. Index Fossils*, 2, 1910, p. 340, fig. 1655.
Cayugan: Williamsville, Buffalo, Akron, etc., New York; Ontario (Akron); Schoharie and High Falls, New York (Cobleskill).

LEPERDITIA SCHMIDTI Kolmodin. See *Leperditia hisingeri*.**Leperditia selwyni** Jones.

Leperditia selwynii Jones, *Geol. Surv. Canada*, *Cont. Micro-Pal.*, pt. 3, 1891, p. 89, pl. 12, figs. 1-5.
Anticostian (Jupiter River): Jupiter River, Anticosti.

Leperditia sinuata Hall.

Leperditia sinuata Hall, *Canadian Nat. Geol.*, 5, 1860, p. 158.—Dawson, *Acadian Geol.*, 2d ed., 1868, p. 609.—Jones, *Quart. Jour. Geol. Soc. London*, 46, 1890, p. 24, pl. 1, figs. 12a-c.
Silurian: Arisaig, Nova Scotia.

Leperditia subcylindrica Ulrich.

Leperditia subcylindrica Ulrich, *Cont. Micro-Pal.*, *Geol. Surv. Canada*, pt. 2, 1889, p. 49, pl. 9, figs. 4-4b.—Whiteaves, *Geol. Surv. Canada*, *Pal. Foss.*, 3, pt. 2, 1895, p. 125.
Richmond (Stony Mountain): Stony Mountain, Manitoba.

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Leperditia sublævis (Shumard).

Cythere sublævis Shumard, 1st and 2d Ann. Rep. Geol. Surv. Missouri, 2, 1855, p. 195, pl. 8, fig. 15.

Leperditia sublævis Keyes, Missouri Geol. Surv., 4, 1894, p. 239.

St. Peter (Joachim): St. Louis, Ste. Genevieve, and Ralls Counties, Missouri.

LEPERDITIA SULCATA Ulrich. See *Leperditella sulcata*.

Leperditia symmetrica Hortedahl.

Leperditia symmetrica Hortedahl, 2d Arct. Exp., 1898-1902, No. 32, 1914, p. 37, pl. 8, fig. 15.

Helderbergian (Lower beds): Southwestern Ellesmereland, Arctic America.

LEPERDITIA TUMIDA Ulrich. See *Leperditella sulcata*.

Leperditia tumidula Ulrich.

Leperditia tumidula Ulrich, Jour. Cincinnati Soc. Nat. Hist., 13, 1891, p. 175, pl. 11, figs. 4a-c.

Trenton (Perryville): Danville, Kentucky.

Holotype.—Cat. No. 41284, U.S.N.M.

Leperditia turgida Billings.

Leperditia turgida Billings, Pal. Foss., 1, Geol. Surv. Canada, 1865, p. 299.

Canadian (Quebec—F, H): Port aux Choix and Cape Norman, Newfoundland.

LEPERDITIA UNICORNIS Ulrich. See *Primitiella unicornis*.

Leperditia ventralis Billings.

Leperditia ventralis Billings, Geol. Surv. Canada, Pal. Foss., 1, 1865, p. 300.

Chazyan (Quebec—N): Bonne Bay, Newfoundland.

Leperditia whiteavesi Jones.

Leperditia Whiteavesi Jones, Geol. Surv. Canada, Cont. Micro-Pal., pt. 3, 1891, p. 87, fig. 6; pl. 12, figs. 11-14.

Niagaran: Chemahawin and Old Fort Island, Cedar Lake, Saskatchewan River, Canada.

LEPIDOCOLEUS Faber.

Genotype: *Plumulites jamesi* Hall and Whitfield.

Lepidocoleus Faber, Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 15.—Miller, N. A.

Geol. Pal., 1889, p. 553; *ibid.*, 1st App., 1892, p. 709.—Clarke, Amer. Geol.,

17, 1896, pp. 137, 139; Zittel-Eastman Textb. Pal., 1900, p. 649; *ibid.*, 2d ed.,

1913, p. 743.

Lepidocoleus jamesi (Hall and Whitfield).

Plumulites Jamesi Hall and Whitfield, Geol. Surv. Ohio, Pal., 2, 1875, p. 106, pl. 4, figs. 1-3.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 274, fig. 19.—

Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 723, figs.

Lepidocoleus Jamesi Faber, Jour. Cincinnati Soc. Nat. Hist., 9, 1886, p. 15, pl. 1, figs. A-F.—Hall and Clarke, Pal. New York, 7, 1888, p. 64, fig.—Miller, N. A. Geol. Pal., 1889, p. 553, figs. 1022-1023.—Miller and Faber, Jour. Cincinnati Soc. Nat. Hist., 17, 1894, p. 32.—Clarke, Amer. Geol., 17, 1896, pp. 137-143, pl. 7, fig. 9.—Ruedemann, Bull. New York State Mus., 42, 1901, p. 521, pl. 2, figs. 10-12.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 1050, pl. 53, figs. 13-13d.

Trenton and Cincinnati: Cincinnati, Ohio, and vicinity; Saratoga County, New York.

Lepidocoleus sarlei Clarke.

Lepidocoleus sarlei Clarke, Amer. Geol., 17, 1896, pp. 14-143, pl. 7, figs. 1-6.—

Grabau and Shimer, N. A. Index Fossils, 2, 1910, p. 371, fig. 1871.

Clinton (Rochester): Rochester, New York.

LEPIDODISCUS CINCINNATIENSIS Sharman and Newton. See *Agelacrinites cincinnatiensis*.

LEPIDODISCUS FABERI Cumings. See *Agelacrinites faberi*.

LEPIDODISCUS PILEUS Sladen. See *Agelacrinites pileus*.

LEPIDOLITES Ulrich.

Genotype: *L. dickhauti* Ulrich.

Lepidolites Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 20.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 67, pl. F, figs. 11, 12 (extras, 1893).—Ulrich, Amer. Geol., 1, 1888, p. 324.—Miller, N. A. Geol. Pal., 1889, p. 160.

Ischadites James, Jour. Cincinnati Soc. Nat. Hist., 8, 1885, p. 163.

Receptaculites James, Jour. Cincinnati Soc. Nat. Hist., 14, 1891, p. 60.

Lepidolites dickhauti Ulrich.

Lepidolites dickhauti Ulrich, Jour. Cincinnati Soc. Nat. Hist., 2, 1879, p. 21, pl. 7, figs. 17-17b.—Winchell and Schuchert, Geol. Minnesota, 3, pt. 1, 1895, p. 67, pl. F, figs. 11, 12.

Ischadites dickhauti James, Jour. Cincinnati Soc. Nat. Hist., 8, 1885, p. 165; *ibid.*, 9, 1886, p. 249.

Receptaculites dickhauti James, *ibid.*, 14, 1891, p. 63.

Lepidolites elongatus Ulrich, *ibid.*, 2, 1879, p. 22, pl. 7, fig. 16.

Ischadites elongatus James, *ibid.*, 8, 1885, p. 165.

Eden (Southgate): Covington, Kentucky.

Cotypes.—Cat. No. 46533, U.S.N.M.

LEPIDOLITES ELONGATUS Ulrich. See *Lepidolites dickhauti*.

LEPOCRINITES Conrad.

Genotype: *L. gebhardi* Conrad.

Lepocrinites Conrad, Ann. Rep. New York Geol. Surv., 1840, p. 207.—Vanuxem, Nat. Hist. New York, Geol., 3, 1842, p. 117, fig. 4.—Mather, *ibid.*, 1, 1843, p. 346, fig. 4.—Schuchert, Smiths. Misc. Coll., 47, 1904, p. 213.

Lepocrinus or *Lepadocrinus* Hall, Pal. New York, 3, 1859, p. 125, pl. 7, figs. 1-20.

Apiocystites Jaekel (part), Stammesg. Pelmat., Berlin, 1, 1899, p. 279, fig. 59.

Lepadocrinus Bather (part), Treatise Zool., pt. 3, Echinoderma, London, 1900, p. 61.—Haeckel, Die Amphorideen und Cystoideen, Leipzig, 1896, p. 134.

Lepocrinites gebhardi Conrad.

Lepocrinites gebhardi Conrad, 4th Ann. Rep. New York Geol. Surv., 1840, p. 207.—Vanuxem, Nat. Hist. New York, Geol., 3, 1842, p. 117, fig. 4.—Mather, *ibid.*, 1, 1843, p. 346, fig. 4.—Hall, *ibid.*, 4, 1843, tab. ill. 27, fig. 4.—Owen, Amer. Jour. Sci., 2d ser., 1846, p. 49, fig. 4.—Lincklaen, 14th Rep. New York State Cab. Nat. Hist., 1861, p. 58, pl. 9, fig. 2.—Schuchert, Smiths. Misc. Coll., 47, pt. 2, 1904, p. 215.

Lepocrinus gebhardi Hall, Pal. New York, 3, 1859 (1861), p. 127, pl. 7, figs. 1-20.—Haeckel, Die Amphorideen und Cystoideen, Leipzig, 1896, p. 135.

Apiocystites gebhardi Jaekel, Stammesg. Pelmat., 1, Berlin, 1899, p. 282, fig. 59. Helderbergian (Manlius transition beds or Coeymans): Schoharie, etc., New York.

Lepocrinites manlius Schuchert.

Lepocrinites manlius Schuchert, *Smiths. Misc. Coll.*, 47, 1904, p. 214, pl. 37, figs. 2, 3; pl. 39, figs. 15, 16; text fig. 23; *Maryland Geol. Surv., Low. Dev.*, 1913, p. 231, pl. 32, figs. 8, 9; pl. 35, figs. 15, 16.

Helderbergian (Keyser): Keyser, West Virginia.

Holotype.—Cat. No. 35062, U.S.N.M.

LEPOCRINITES MOOREI Meek. See *Lepadocystis moorei*.

LEPOCRINUS Hall. See *Lepocrinites* Conrad.

LEPTÆNA Dalman.

Genotype: *Productus rugosa* Hisinger=*Conchita rhomboidalis* Wilckens.

Leptæna Dalman, *Kongl. Svenska Vet.-Akad. Handl.*, for 1827, 1828, pp. 93, 94.—King, *Mon. Permian Foss.*, *Pal. Soc.*, 1850, p. 104.—Billings, *Canadian Nat. Geol.*, 1, 1856, p. 133.—Pictet, *Traité de Pal.*, 2d ed., 4, 1857, p. 60.—Miller, *Cincinnati Quart. Jour. Sci.*, 2, 1875, Jan., p. 56.—Zittel, *Handb. Pal.*, 1, 1880, p. 678.—Winchell, 9th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1881, p. 118.—Miller, *N. A. Geol. Pal.*, 1889, p. 347.—Beecher, *Amer. Jour. Sci.*, 3d ser., 44, 1892, pp. 145, 147.—Hall and Clarke, *Pal. New York*, 8, pt. 1, 1892, p. 276.—Winchell and Schuchert, *Geol. Minnesota*, 3, 1893, p. 409.—Hall and Clarke, 11th Ann. Rep. New York State Geol., 1894, p. 277.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 237, fig. 198, 4-6.—Schuchert, *Zittel-Eastman Textb. Pal.*, 1, 1900, 313.—Grabau, *Bull. New York State Mus.*, 45, 1901, p. 180; *Bull. Buffalo Soc. Nat. Sci.*, 7, 1901, p. 180.—Grabau and Shimer, *N. A. Index Fossils*, 1, 1907, p. 225.—Cumings, 32d Ann. Rep., *Dep. Geol. Nat. Res. Indiana*, 1908, p. 889.—Schuchert, *Zittel-Eastman Textb. Pal.*, 1913, p. 384.

Leptagonia McCoy, *Carb. Foss. Ireland*, 1844, p. 116, figs. 11-13.—D'Orbigny, *Compt. Rend. de l'Acad. Sci.*, 25, 1847, p. 267.—McCoy, *British Pal. Rocks and Foss.*, 1854, p. 247.—Zittel, *Handb. Pal.*, 1, Munich, 1880, p. 678.—Winchell, 9th Ann. Rep. Geol. Nat. Hist. Surv. Minnesota, 1881, p. 118.—Koken, *Die Leitfossilien*, Leipzig, 1896, p. 237, fig. 198, 4-6.

Plectambonites Oehlert, *Fischer's Manual Conch.*, 1887, p. 1283.

LEPTÆNA ALTERNATA Conrad. See *Rafinesquina alternata*.

LEPTÆNA ALTERNISTRIATA Hall. See *Rafinesquina alternata alternistriata*.

LEPTÆNA ASPERA James. See *Plectambonites rugosa*.

LEPTÆNA BARABUENSIS Whitfield. See *Syntrophia barabuensis*.

LEPTÆNA BIPARTITA Hall. See *Stropheodonta (Leptostrophia) bipartita*.

LEPTÆNA CAMERATA Hall. See *Rafinesquina deltoidea*.

Leptæna charlottæ Winchell and Schuchert.

Leptæna charlottæ Winchell and Schuchert, *Amer. Geol.*, 9, April 1, 1892, p. 288; *Geol. Minnesota*, 3, 1893, p. 410, pl. 32, figs. 1-5.

Strophomena halli Sardeson, *Bull. Minnesota Acad. Nat. Sci.*, 3, April 9, 1892, p. 334, pl. 4, figs. 36-38.

Black River (Decorah): Minneapolis and St. Paul, Minnesota.

LEPTÆNA CORRUGATA Hall. See *Stropheodonta corrugata* and *S. corrugata pleuristriata*.

LEPTÆNA DECIPIENS Billings. See *Leptella decipiens*.

LEPTÆNA DEFLECTA Hall. See *Dinorthis (Plæsiomys) deflecta*.

LEPTÆNA DELTOIDEA Hall. See *Rafinesquina deltoidea*.

LEPTÆNA DELTOIDES Owen. See *Rafinesquina minnesotensis*.

LEPTÆNA DEPRESSA Hall. See *Leptæna rhomboidalis*.

LEPTÆNA EUGLYPHA Hisinger. See *Strophonella euglypha*.

LEPTÆNA FASCIATA Hall. See *Leptæna incrassata*.

LEPTÆNA FILITEXTA Hall. See *Strophomena incurvata*.

LEPTÆNA GIBBOSA Miller. See *Plectambonites gibbosus*.

Leptæna gibbosa (James).

Strophomena gibbosa James, Cincinnati Quart. Jour. Sci., 1, 1874, p. 333.

Leptæna gibbosa Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 316; *ibid.*, 17, 1912, p. 116, pl. 1, figs. 5a-c.

Eden (Economy): Cincinnati, Ohio, and vicinity; Boyd and north of Ford, Kentucky.

Leptæna gibbosa invenusta Foerste.

Leptæna gibbosa invenusta Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 315, pl. 7, fig. 3.

Eden (Fulton or Lower Economy): Two miles west of Drennan Springs, Kentucky.

LEPTÆNA GLABRA Foerste. See *Plectambonites glaber*.

Leptæna incrassata Hall.

Leptæna incrassata Hall, Pal. New York, 1, 1847, p. 19, pl. 4 bis, figs. 2a-c.—Rogers, Geol. Pennsylvania, pt. 2, 1858, p. 817, fig. 519.

Strophomena incrassata Billings, Canadian Nat. and Geol., 4, 1859, p. 423.—Winchell and Schuchert, Pal. Minnesota, 3, pt. 1, 1893, p. 410.—Raymond, Carnegie Mus., 7, 1911, p. 230, pl. 34, figs. 32-37, figs. 1-5.

Leptæna fasciata Hall, Pal. New York, 1, 1847, p. 19, pl. 4 bis, figs. 3a, b (not 3c).

Strophomena fasciata Emmons, Amer. Geology, 1, pt. 2, 1855, p. 235, pl. 3, fig. 24.—Hall, 12th Ann. Rep. New York State Cab. Nat. Hist., 1858, p. 70.—

Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1126, fig.

Rafinesquina fasciata Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 283.

Leptæna plicifera Hall, Pal. New York, 1, 1847, p. 19, pl. 4 bis, fig. 1.

Strophomena plicifera Emmons, Amer. Geology, 1, pt. 2, 1855, pl. 3, figs. 21b, c.—Hall, 12th Rep. New York State Cab. Nat. Hist., 1859, p. 70.

Dalmanella? *plicifera* Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 202.

Chazy: Mingan Islands, Canada (Mingan); Chazy, Valcour Island, Crown Point, etc., New York (Crown Point, Valcour).

LEPTÆNA INCRASSATA Hall. See *Rafinesquina incrassata*.

Leptæna julia (Billings).

Strophomena julia Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 127, fig. 105 (adv. sheets, 1862).

Leptæna julia Shaler, Bull. Mus. Comp. Zool., 1865, p. 65.

Anticostian (Jupiter River): The Jumpers, Anticosti.

LEPTÆNA MELITA Hall and Whitfield. See *Dalmanella melita*.

LEPTÆNA MESACOSTA Shumard. See *Rafinesquina mesicosta*.

LEPTÆNA MINNESOTENSIS Sardeson. See *Plectambonites minnesotensis*.

Leptæna nitens (Billings).

Strophomena nitens Billings, Canadian Nat. Geol., 5, 1860, p. 53, fig. 1; Pal Foss., 1, Geol. Surv. Canada, 1865, p. 118, fig. 97 (adv. sheets, 1862); Geol. Canada, 1863, p. 209, fig. 208.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1130, figs.

Rafinesquina nitens Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 283.

Leptæna nitens Whiteaves, Pal. Foss., Geol. Surv. Canada, 3, pt. 2, 1895, p. 120. Richmond: Charleton Point, etc., Anticosti (Charleton and English Head and Gamachian); Stony Mountain, Manitoba (Stony Mountain); Wyoming; etc.

LEPTÆNA OBSCURA Hall. See *Rafinesquina obscura*.

LEPTÆNA ORTHIDIDEA Hall. See *Strophomena? orthididea*.

LEPTÆNA PATENTA Hall. See *Strophonella patenta*.

• **LEPTÆNA PLANOCONVEXA** Hall. See *Strophomena planoconvexa*.

LEPTÆNA PLANUMBONA Hall. See *Strophomena planumbona*.

LEPTÆNA PLICATELLA Ulrich. See *Plectambonites plicatellus*.

LEPTÆNA PLICIFERA Hall. See *Leptæna incrassata*.

LEPTÆNA PRECOSIS Sardeson. See *Plectambonites precosis*.

LEPTÆNA PROFUNDA Hall. See *Stropheodonta profunda*.

LEPTÆNA PROLONGATA Foerste. See *Plectambonites transversalis prolongatus*.

LEPTÆNA QUADRILATERA Shaler. See *Leptæna rhomboidalis*.

LEPTÆNA RECEDENS Sardeson. See *Plectambonites recedens*.

LEPTÆNA RECTA Hall. See *Dinorthis (Plæsiomys) deflecta*.

Leptæna reticulata (Shaler).

Strophomena reticulata Shaler, Bull. Mus. Comp. Zool., 4, 1865, p. 62.

Richmond (Charleton) and Gamachian (Ellis Bay): Ellis Bay, Anticosti.

Leptæna rhomboidalis (Wilckens).

Conchita rhomboidalis Wilckens, Nachricht von selten Versteinerungen, 1769, p. 77, pl. 8, figs. 43, 44.

Anomites rhomboidalis Wahlenberg, Acta Soc. Upsala, 3, 1821, p. 65.

Strophomena undulosa Conrad, 5th Ann. Rep. Geol. Surv. New York, 1841, p. 54.

Strophomena depressa Vanuxem, Geol. New York, Rep. 3d Dist., 1842, p. 79, fig. 5.—Hall, *ibid.*, Rep. 4th Dist., 1843, p. 77, fig. 5; p. 104, fig. 2.—Billings, Canadian Nat. Geol., 1, 1856, p. 59, pl. 1, fig. 5.—Roemer, Sil. Fauna West Tennessee, 1860, p. 65, pl. 5, fig. 2.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1126, figs.

Strophomena undulatus Vanuxem, Geol. New York, Rep. 3d Dist., 1842, p. 139, fig. 3.—Hall, *ibid.*, Rep. 4th Dist., 1843, p. 175, fig. 3.—Yandell and Shumard, Cont. Geol. Kentucky, 1847, p. 11.

Productus? sulcatus Castelnau, Essai Syst. Sil. l'Amérique Septentrionale, 1843, p. 39, pl. 13, fig. 7.

Productus sulcifer de Verneuil, *ibid.*, 1843, p. 39.

Leptæna depressa Hall, Pal. New York, 2, 1852, p. 62, pl. 21, fig. 8; p. 257, pl. 53, fig. 6.—Rogers, Geol. Pennsylvania, 2, pt. 2, 1858, p. 823, fig. 630.

Leptaena rhomboidalis—Continued.

Strophomena rugosa Hall, Pal. New York, 3, 1859, p. 195, pl. 19, fig. 1.—Safford, Geol. Tennessee, 1869, p. 315, fig. 11.—Miller, N. A. Geol. Pal., 1889, p. 383, fig. 623.—Lesley, Rep. Geol. Surv. Pennsylvania, P 4, 1890, p. 1138, fig.

Strophomena rhomboidalis Billings, Canadian Jour., 6, 1861, p. 336, figs. 111, 112; Geol. Canada, 1863, p. 311, fig. 314; p. 367, fig. 373; Proc. Portland Soc. Nat. Hist., 1863, p. 107, pl. 3, fig. 1.—Chapman, Expos. Min. and Geol. Canada, 1864, p. 115, fig. 96; p. 193, fig. 232.—Hall, Pal. New York, 4, 1867, p. 76, pl. 12, figs. 16–18; p. 414, pl. 15, figs. 15, 16.—Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 426, pl. 10, fig. 7.—Davidson, Mon. British Sil. Brach., Pal. Soc., 1871, p. 281, pl. 39, figs. 1–21; pl. 44, fig. 1.—Billings, Pal. Foss., 2, 1874, p. 27.—White, Wheeler's Expl. Surv. West 100th Merid., 4, 1875, p. 85, pl. 5, fig. 5.—Hall and Whitfield, King's U. S. Geol. Expl. 40th Parl., 4, 1877, p. 253, pl. 4, fig. 4.—Hall, 28th Rep. New York State Mus. Nat. Hist., 1879, p. 151, pl. 22, figs. 4–10; 11th Rep. State Geol. Indiana, 1882, p. 288, pl. 22, figs. 4–10; 2d Ann. Rep. New York State Geol., 1883, pl. 38, figs. 17–31.—Walcott, Mon. U. S. Geol. Surv., 8, 1884, p. 118.—Hall, 35th Rep. New York State Mus. Nat. Hist., 1884, pl. 22, fig. 1.—Herrick, Amer. Geol., 3, 1889, pl. 4, fig. 6.—Beecher and Clarke, Mem. New York State Mus., 1, 1889, p. 18, pl. 2, figs. 1–13.—Nettleroth, Kentucky Fossil Shells, Mem. Geol. Surv. Kentucky, 1889, p. 150, pl. 18, figs. 1–3.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1131, figs.—Foerste, Proc. Boston Soc. Nat. Hist., 24, 1890, p. 298.—Beecher, Amer. Jour. Sci., 3d ser., 41, 1891, p. 357, pl. 17, figs. 18–21.—Herrick, Geol. Ohio, 7, 1895, pl. 20, fig. 6.

Strophomena analoga Davidson, Quart. Jour. Geol. Soc. London, 19, 1863, p. 173, pl. 9, fig. 18.—Dawson, Acadian Geol., 3d ed., 1878, p. 295, fig. 95.

Leptaena quadrilatera Shaler, Bull. Mus. Comp. Zool., 4, 1885, p. 65.

Leptaena rhomboidalis Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 279, pl. 8, figs. 17–31; pl. 15A, figs. 40–42; pl. 20, figs. 21–24.—Foerste, Geol. Ohio, 7, 1895, p. 566.—Weller, Jour. Geol., 3, 1895, p. 912.—Girty, Mon. U. S. Geol. Surv., 32, pt. 2, 1899, p. 525; 19th Ann. Rep. U. S. Geol. Surv., 1899, p. 563.—Clarke, Mem. New York State Mus., 3, 1900, p. 57.—Grabau, Bull. Buffalo Soc. Nat. Sci., 7, 1901, p. 180, fig. 84.—Weller, Trans. Acad. Sci. St. Louis, 11, 1901, p. 159, pl. 14, figs. 19, 20; p. 180, pl. 16, figs. 7, 8.—Kindle, 25th Ann. Rep. Indiana Dep. Geol. Nat. Res., 1901, p. 593, pl. 4, fig. 5.—Weller, Jour. Geol., 9, 1901, p. 136.—Grabau, Bull. New York State Mus., 45, 1901, p. 180, fig. 84.—Ruedemann, Bull. New York State Mus., 49, for 1901, 1902, p. 18.—Clarke and Ruedemann, Mem. New York State Mus., 5, 1903, p. 42.—Weller, Geol. Surv. New Jersey, Pal., 3, 1903, p. 228, pl. 20, fig. 10; p. 278, pl. 27, fig. 9; p. 302, pl. 33, fig. 10; p. 325, pl. 41, fig. 10; p. 366, pl. 51, fig. 19.—Girty, U. S. Geol. Surv., Prof. Paper 21, 1904, p. 48, pl. 10, fig. 3.—Kindle and Breger, 28th Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1904, p. 431, pl. 2, fig. 17.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 226, figs. 273a–b.—Foerste, Jour. Cincinnati Soc. Nat. Hist., 21, 1909, p. 20.—Maynard, Maryland Geol. Surv., Low. Dev., 1913, p. 308, pl. 56, figs. 13–17.—Savage, Bull. Geol. Surv., Illinois, 23, 1913, p. 47, pl. 1, fig. 11; pl. 4, fig. 3, p. 72.

Leptaena (*Strophomena*) *rhomboidalis* Beecher, Amer. Jour. Sci., 3d ser., 46, 1892, p. 150, pl. 1, figs. 7–9.

Plectambonites rhomboidalis Keyes, Geol. Surv. Missouri, 5, 1895, p. 70, fig. 6.

Silurian-Mississippian: Widely distributed throughout Europe and America.

Plesiotypes.—Cat. Nos. 56722, 56723, U.S.N.M.

Leptaena richmondensis Foerste.

Leptaena tenuistriata Hall (part), Pal. New York, 1, 1847, p. 108, pl. 31A, fig. 4.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pl. 8, figs. 12–16.

Leptæna richmondensis—Continued.

- Strophomena tenuistriata* Safford, Geol. Tennessee, 1869, p. 275, fig. 2.
Strophomena rhomboidalis Meek, Pal. Ohio, 1, 1873, p. 75, pl. 5, fig. 6.—Miller, Jour. Cincinnati Soc. Nat. Hist., 4, 1881, p. 1.
Strophomena tenuistriata Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 55.—Hall, 2d Ann. Rep. New York State Geol., 1883, pl. 38, figs. 12–16.—Lesley, Geol. Surv. Pennsylvania, Rep. P 4, 1890, p. 1134, figs.
Leptæna rhomboidalis Cumings, 32d Ann. Rep. Dep. Geol. and Nat. Res. Indiana, 1908, p. 909, pl. 34, figs. 5–5d.
Leptæna richmondensis Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 211, pl. 4, figs. 10a, b; *ibid.*, 17, 1912, p. 117, pl. 1, figs. 6a–c.
 Richmond: Ohio, Indiana, Kentucky, and Tennessee.

Leptæna richmondensis precursor Foerste.

- Leptæna richmondensis precursor* Foerste, Bull. Sci. Lab. Denison Univ., 14, 1909, p. 211, pl. 4, fig. 11; Ohio Nat., 12, 1912, p. 453, pl. 22, fig. 7.
 Richmond (Arnheim): Arnheim and other localities in Ohio and Kentucky.

LEPTÆNA RUGOSA James. See *Plectambonites rugosa*.

LEPTÆNA SAXEA Sarseson. See *Plectambonites saxea*.

LEPTÆNA SERICEA Sowerby. See *Plectambonites sericeus*.

LEPTÆNA SERICEA var. *RUGOSA* Meek. See *Plectambonites rugosa*.

LEPTÆNA SORDIDA Billings. See *Leptella sordida*.

Leptæna(?) stelzneri Kayser.

- Leptæna stelzneri* Kayser, Palæontographica, Suppl., 3, 1876, p. 21, pl. 3, fig. 21.—Schuchert, Bull. U. S. Geol. Surv., 87, 1897, p. 241.
 Ordovician: Guaco, Argentina.

LEPTÆNA STRIATA Hall. See *Strophonella striata*.

LEPTÆNA SUBPLANA Hall. See *Schuchertella subplana*.

LEPTÆNA SUBQUADRATA Hall. See *Christiania subquadrata*.

LEPTÆNA SUBTENTA Hall. See *Strophomena planumbona subtenta*.

LEPTÆNA SUBTENTA (part) Hall. See *Strophomena trentonensis*.

LEPTÆNA SULCATA Verneuil. See *Strophomena sulcata*.

LEPTÆNA TENUILINEATA Hall. See *Rafinesquina tenuilineata*.

Leptæna tenuistriata Sowerby.

- Leptæna tenuistriata* Sowerby in Murchison's Sil. Syst., 2, 1839, p. 636, pl. 22, fig. 2a.—Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 45, pl. 5, fig. 9.
 Caradoc sandstone: Montgomeryshire, England.
 Trenton (Hermitage): Clifton, Tennessee.

LEPTÆNA TENUISTRIATA Hall. See *Leptæna richmondensis*.

LEPTÆNA TRANSVERSALIS Hall. See *Plectambonites transversalis*.

LEPTÆNA TRANSVERSALIS var. *ALABAMENSIS* Foerste. See *Plectambonites transversalis alabamensis*.

LEPTÆNA TRANSVERSALIS var. **PROLONGATA** Foerste. See *Plectambonites transversalis prolongatus*.

LEPTÆNA TRILOBATA Owen. See *Strophomena trilobata*.

Leptæna unicastata (Meek and Worthen).

Leptæna (n. sp.?) Owen, Geol. Surv. Wisconsin, Iowa, Minnesota, 1852, pl. 2B, fig. 3.

Strophomena unicastata Meek and Worthen, Geol. Surv. Illinois, 3, 1868, p. 335, pl. 4, fig. 11.—Whitfield, Geol. Wisconsin, 4, p. 262, pl. 12, fig. 14.

Rafinesquina unicastata Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pl. 15A, fig. 39; pl. 20, fig. 25.

Leptæna unicastata Winchell and Schuchert, Geol. Minnesota, 3, 1893, p. 411, pl. 32, figs. 6-9.—Whiteaves, Pal. Foss., 3, pt. 3, 1897, p. 174.—Grabau and Shimer, N. A. Index Fossils 1, 1907, p. 226, figs. 271i-j.

Richmond: Savannah and Wilmington, Illinois; Delafield and Iron Ridge, Wisconsin; Spring Valley and Granger, Minnesota; Lattners, Iowa; Rapids of the Nelson River, Lake Winnipeg, Manitoba; Texas; etc.

LEPTAGONIA McCoy. See *Leptæna* Dalman.

LEPTELLA Hall and Clarke.

Genotype: *Leptæna sordida* Billings.

Leptella Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 293; 11th Ann. Rep. New York State Geol., 1894, p. 277.—Miller, N. A. Geol. Pal., 1st App., 1892, p. 688.

Leptella decipiens (Billings).

Leptæna decipiens Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 74, fig. 67; p. 219 (adv. sheets 1862); Geol. Canada, 1863, p. 231, fig. 243.

Leptella decipiens Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 294.

Ozarkian or Canadian: Point Levis, Quebec (Levis-Limestone No. 2); four miles northeast of Portland Creek, Newfoundland (Quebec—P).

Leptella sordida (Billings).

Leptæna sordida Billings, Pal. Fossils, 1, Geol. Surv. Canada, 1865, p. 73, text fig. 66 (adv. sheets 1862); Geol. Canada, 1863, p. 231, fig. 242.

Leptella sordida Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 293, pl. 15A, figs. 12-16.

Ozarkian? (Levis—erratic): Point Levis, Quebec.

LEPTOBOLUS Hall.

Genotype: *L. lepis* Hall.

Leptobolus Hall, Description n. sp. Foss. from Hudson River Group, 1871, p. 3; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 226.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, Jan., p. 10.—Nicholson, Rep. Pal. Prov. Ontario, pt. 2, 1875, p. 85.—Zittel, Handb. Pal., 1, 1880, p. 665.—Miller, N. A. Geol. Pal., 1889, p. 348.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pp. 73, 165; 11th Ann. Rep. New York State Geol., 1894, p. 241.—Schuchert, Zittel-Eastman Textb. Pal., 1, 1900, p. 307.—Matthew, Trans. Roy. Soc. Canada, 2d ser., 8, sec. 4, 1902, p. 102.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 194.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, p. 890.—Schuchert, Zittel-Eastman Textb. Pal., 1913, p. 372.

LEPTOBOLUS GEMMULUS Matthew. See *Lingulella ferruginea*.

LEPTOBOLUS GRANDIS Matthew. See *Lingulella grandis*.

Leptobolus insignis Hall.

Leptobolus insignis Hall, Descrip. n. sp. Foss. from Hudson River Group, 1871, p. 3, pl. 3, fig. 17; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 227, pl. 7, fig. 17.—Nicholson, Pal. Province Ontario, 1875, p. 85.—Ami, *Canadiana Rec. Sci.*, 3, p. 103 (loc. occ.).—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 74, pl. 3, figs. 1-6.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 194.

Utica: Middleville, Utica, etc., New York; Ottawa, Ontario; Cincinnati, Ohio (Fulton); Macasty Bay, Anticosti (Macasty).

Leptobolus lepis Hall.

Leptobolus lepis Hall, Description n. sp. Foss. from Hudson River Group, 1871, p. 3, pl. 3, figs. 19, 20; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 226, pl. 7, figs. 19, 20.—Hall and Whitfield, Pal. Ohio, 2, 1875, p. 69, pl. 1, figs. 10, 11.—Miller, Cincinnati Quart. Jour. Sci., 2, 1875, p. 11.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, p. 74, pl. 3, figs. 8-10.—Cummings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 911, pl. 34, figs. 6, 6a.

Trenton (Upper): Cincinnati, Ohio, and vicinity.

Leptobolus lepis cliftonensis Foerste.

Leptobolus lepis cliftonensis Foerste, Bull. Sci. Lab. Denison Univ., 16, 1910, p. 21, pl. 2, figs. 20a-c.

Trenton (Hermitage): Clifton, Tennessee.

Leptobolus occidentalis Hall.

Leptobolus occidentalis Hall, Description n. sp. Foss. from Hudson River Group, 1871, p. 3, pl. 3, fig. 18; 24th Rep. New York State Cab. Nat. Hist., 1872, p. 227, pl. 7, fig. 18.—Hall and Clarke, Pal. New York, 8, pt. 1, 1892, pl. 3, fig. 7.—Grabau and Shimer, N. A. Index Fossils, 1, 1907, p. 194.

Richmond: Hawleys Mills, Iowa; Platteville, Wisconsin (Maquoketa); Arkansas and Oklahoma (Sylvan).

Leptobolus walcotti Ruedemann.

Leptobolus walcotti Ruedemann, Bull. New York State Mus., 42, 1901, p. 569, pl. 1, figs. 6-12.

Chazy (Normanskill): Mount Moreno, near Hudson, New York; Arkansas; Tennessee.

LEPTOCÆLIA Hall. See *Cœlospira* Hall.

LEPTOCÆLIA DISPARILIS Hall. See *Atrypina disparilis*.

LEPTOCÆLIA INTERMEDIA Hall. See *Atrypina intermedia*.

LEPTODESMA Hall.

Genotype: *L. potens* Hall.

Leptodesma Hall, Pal., New York, 5, pt. 1, Lam. (adv. copy), 1883, p. 4; *ibid.*, 1, 1884, pp. 13, 175; 35th Rep. New York State Mus. Nat. Hist., 1884, pp. 347, 406c.—Miller, N. A. Geol. Pal., 1889, p. 484.—Jackson, Amer. Nat., 24, 1890, p. 1141; Mem. Boston Soc. Nat. Hist., 4, 1890, p. 381.—Clarke, Amer. Geol., 13, 1894, pp. 286-289, figs.—Hind, Mon. British Carb. Lam., 2, Pal. Soc., 1901, p. 10.

Leptodesma rhomboidea (Hall).

Avicula rhomboidea Hall, Pal. New York, 2, 1852, p. 84, pl. 27, figs. 2a, b, c, d. *Leptodesma rhomboideum* Whitfield and Hovey, Bull. Amer. Mus. Nat. Hist., 11, 1899, pl. 2, p. 158 (gen. ref.).

Clinton: New Hartford and Sodus, New York; Arisaig, Nova Scotia.

LEPTODOMUS McCoy.Genotype: *L. fragilis* McCoy.

Leptodomus McCoy, Syn. Char. Carb. Foss. Ireland, 1844, p. 66; British Pal. Rocks and Foss., 1854, p. 277.—Pictet, *Traite de Pal.*, 2d ed., 3, 1855, p. 531.—Billings, Proc. Portland Soc. Nat. Hist., 1, 1863, p. 117.—Winchell and Marcy, Mem. Boston Soc. Nat. Hist., 1, 1865, p. 108.—Zittel, Handb. Pal., 2, Munich, 1881, p. 129.—Miller, N. A. Geol. Pal., 1889, p. 485.—Koken, Die Leitfossilien, Leipzig, 1896, p. 526.

Leptodomus (Sanguinolites) aratus Hall.

Leptodomus (Sanguinolites) aratus Hall, Canadian Nat. Geol., 5, 1860, p. 152.—Dawson, Acadian Geol., 2d ed., 1868, p. 603.

Silurian: Arisaig, Nova Scotia.

LEPTODOMUS (AMPHICÆLIA) LEIDYI Whitfield. See *Amphicælia leidy*.**LEPTODOMUS NEGLECTUS** Whitfield. See *Amphicælia neglecta*.**LEPTODOMUS UNDULATUS** Whitfield. See *Ambonychia undulata*.**LEPTOGRAPTUS** Lapworth.Genotype: *Graptolithus flaccidus* Hall.

Leptograptus Lapworth, Geol. Mag., 10, 1873, p. 558.—Zittel, Handb. Pal., 1, Munich, 1879, p. 298.—Tullberg, Sveriges Geol. Unders., Ser. C, No. 55, 1883, pp. 12, 14.—Koken, Die Leitfossilien, Leipzig, 1896, p. 328.—Wiman, Bull. Geol. Inst. Univ. Upsala, 2, pt. 2, 1896, p. 266.—Walther, Zeits. geol. Gesell., 49, 1897, p. 251.—Roemer and Frech, Leth. geog., 1, Theil, Leth. Pal., 1, 3 Lief., 1897, p. 591; Zittel-Eastman Textb. Pal., 1, 1900, p. 118.—Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. 104.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 260; Zittel-Eastman Textb. Pal., 2d ed., 1913, p. 130.

Leptograptus annectans (Walcott).

Graptolithus annectans Walcott, Trans. Albany Inst., 10, 1883 (adv. sheets 1879), pp. 20, 35, pl. 1, figs. 2, 2a.

Leptograptus annectans Lapworth, Trans. Roy. Soc. Canada, 4, 1886, 183.—Ami, Can. Rec. Sci., 9, 1893, 180.—Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 264-266, pl. 14, fig. 5; figs. 180-183.

Graptolithus tenuis? Ulrich, Cat. Foss. Cincinnati group, 1880.

Utica: Holland Patent, New York; Cincinnati, Ohio, and vicinity.

Plesiotype.—Cat. No. 54274, U.S.N.M.

Leptograptus flaccidus (Hall).

Graptolithus flaccidus Hall, Geol. Surv. Canada, dec. 2, 1865, p. 143, pl. 2, figs. 17-19.

Graptolithus (Monoprion) flaccidus Hall, 20th Rep. New York State Cab. Hist., 1868, pl. 3, figs. 10, 11; rev. ed., 1870, pl. 3, figs. 10, 11; p. 223.

Leptograptus flaccidus Gurley, Jour. Geol., 4, 1896, p. 99 (gen. ref.).—Elles and Wood, Mon. British Grapt., Pal. Soc., 1903, p. 106, figs. 62a-g; pl. 14, figs. 1a-g. Trenton (Collingwood): Lake St. John, east from Blue Point, Quebec.

Leptograptus flaccidus spinifer Elles and Wood.

Leptograptus flaccidus var. *spinifer* Elles and Wood, Mon. British Grapt., pt. 3, 1903, Pal. Soc., 1903, p. 108, pl. 14, figs. 2a-c.

Leptograptus flaccidus var. *spinifer* mut. *trentonensis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, pp. 262, 263, pl. 14, figs. 8, 9; text figs. 176-178.

Ordovician: England (Hartfell); Glenmont and Mount Moreno, New York (Normanskill).

LEPTOGRAPTUS FLACCIDUS SPINIFER mut. **TRENTONENSIS** Ruedemann. See *Leptograptus flaccidus spinifer*.

Leptograptus flaccidus trentonensis Ruedemann.

Leptograptus flaccidus mut. *trentonensis* Ruedemann, Mem. New York State Mus., 11, pt. 2, 1908, p. 261, pl. 14, fig. 7; figs. 172-175.

Chazyan (Normanskill): Glenmont and Mount Moreno, New York.

Leptograptus macrotheca Gurley.

Leptograptus? *macrotheca* Gurley, Jour. Geol., 4, 1896, p. 69.

Canadian (Levis): Point Levis, Quebec.

LEPTOGRAPTUS SUBTENUIS Walcott. See *Didymograptus subtenuis*.

LEPTOGRAPTUS TENUIS Lapworth. See *Didymograptus subtenuis*.

LEPTOPLASTUS Angelin.

Genotype: *L. stenotus* Angelin.

Leptoplastus Angelin, Pal. Scandinavica, 3d ed., Holmiae, 1878, p. 46.—Brögger.

Die sil. Etagen 2-3, Kristiania, 1882, p. 113.—Matthew, Trans. Roy. Soc.

Canada, 9, sec. 4, 1892, p. 53.—Koken, Die Leitfossilien, Leipzig, 1896, p. 22,

fig. 11, fig. 2.—Lindstrom, Kongl. Sven. Vet.-Akad. Handl., 34, No. 8, 1901, p. 22.

LEPTOPLASTUS (SPHÆROPTHALMUS) ALATUS Brögger. See *Sphærophthalmus alatus*.

LEPTOPLASTUS (CTENOPYGE) FLAGELLIFER Linnarsson. See *Ctenopyge flagellifer*.

Leptoplastus latus Matthew.

Leptoplastus latus Matthew, Canadian Rec. Sci., 4, 1891, p. 462, figs. 1-3; Trans.

Roy. Soc. Canada, 9, sec. 4, 1892, p. 54, pl. 13, figs. 10a-c.

Canadian (Bretonian—Div. C3b): St. John, New Brunswick.

LEPTOPLASTUS (CTENOPYGE?) LOBATA Brögger. See *Ctenopyge? lobata*.

LEPTOPLASTUS (CTENOPYGE) SPECTABILIS Brögger. See *Ctenopyge spectabilis*.

LEPTOPLASTUS SPINGER Matthew. See *Acantholenus spiniger*.

Leptoplastus spinosus Matthew.

Leptoplastus spinosus Matthew, Trans. Roy. Soc. Canada, 9, sec. 4, 1894, p. 106, pl. 17, figs. 4a-e.

Canadian (Bretonian—Div. C3b): St. John, New Brunswick.

LEPTOPOTERION Ulrich.

Genotype: *L. mammiferum* Ulrich.

Leptopoterion Ulrich, Amer. Geol., 3, 1889, pp. 235, 239.—Miller, N. A. Geol.

Pal., 1889, p. 161.—James, J. F., Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1,

1891, p. 54.—Rauff, Abh. d'math.-phys. Classe bayer Akad. Wiss., 17, 1892, p. 691.

Leptopoterion mammiferum Ulrich.

Leptopoterion mammiferum Ulrich, Amer. Geol. 3, 1889, p. 239.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 14, 1891, p. 54.

Chirosporgia faberi Miller, N. A. Geol. Pal., 1889, p. 156, fig. 99.—J. F. James, Jour. Cincinnati Soc. Nat. Hist., 14, pt. 1, 1891, p. 65.

Maysville (Corryville): Cincinnati, Ohio.

LEPTOSTROPHIA Hall and Clarke. See *Stropheodonta* subgenus *Leptostrophia*.

LEPTOTRYPA Ulrich.Genotype: *L. minima* Ulrich.

Leptotrypa Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 158.—Miller, N. A. Geol. Pal., 1889, p. 311.—Ulrich, Geol. Surv. Illinois, 8, 1890, pp. 377, 455; Geol. Minnesota, 3, 1893, p. 316.—Simpson, 14th Ann. Rep. State Geol. New York for 1894, 1897, p. 580.—Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 31.—Ulrich and Bassler, Smiths. Misc. Coll., 47, 1904, pp. 24, 28.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 749.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, p. 207.

LEPTOTRYPA ACERVULOSA Ulrich. See *Cyphotrypa acervulosa*.

Leptotrypa calceola (Miller and Dyer).

Monticulipora calceola Miller and Dyer, Jour. Cincinnati Soc. Nat. Hist., 1, 1878, p. 26, pl. 1, figs. 11, 11a.—James and James, *ibid.*, 11, 1888, p. 27.—J. F. James, *ibid.*, 18, 1895, p. 87.

Monticulipora (Monotrypa) *calceola* Nicholson, Genus *Monticulipora*, 1881, p. 185, pl. 1, figs. 3–3e.

Leptotrypa calceola Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 159.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 853, pl. 20, figs. 1–1c.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

Leptotrypa clavacoides (James).

Chaetetes clavacoides James, Cat. Low. Sil. Foss., 1871, p. 1. (nom. nud.); Cat. Foss. Cincinnati Group, 1875, p. 1.

Monticulipora clavacoides James, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 236.—James and James, *ibid.*, 1888, 11, p. 25.—J. F. James, *ibid.*, 18, 1895, p. 84.

Monticulipora (Monotrypa) *clavacoides* Nicholson, Genus *Monticulipora*, 1881, p. 182, fig. 37.

Leptotrypa clavacoides Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 159.—Bassler, Proc. U. S. Nat. Mus., 30, 1906, p. 42.—Cumings, 32d Ann. Rep. Dep. Geol. Nat. Res. Indiana, 1908, p. 854, pl. 20, figs. 3, 3c.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

LEPTOTRYPA CLAVIFORMIS Ulrich. See *Stigmatella claviformis*.

LEPTOTRYPA CLAVIS Ulrich. See *Stigmatella clavis*.

Leptotrypa? cortex Ulrich.

Leptotrypa cortex Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 162.

Eden (Economy): Covington, Kentucky.

Holotype.—Cat. No. 43677, U. S. N. M.

LEPTOTRYPA DISCOIDEA Ulrich. See *Amplexopora? discoidea*.

LEPTOTRYPA? DYCHEI Nickles and Bassler. See *Stigmatella dychei*.

LEPTOTRYPA FILIOSA Ulrich. See *Amplexopora filiosa*.

Leptotrypa hexagonalis Ulrich.

Leptotrypa hexagonalis Ulrich, Geol. Surv. Illinois, 8, 1890, p. 455, pl. 36, figs. 6, 6a; Geol. Minnesota, 3, 1893, p. 317.—Bassler, Bull. U. S. Nat. Mus., 77, 1911, pp. 208–210, figs. 112–114.

Black River (Platteville): Mineral Point, Janesville, and Beloit, Wisconsin; Calhoun County, Illinois; Minneapolis, Minnesota.

Middle Ordovician (Kuckers): Near Jewe, Esthonia, Russia.

Holotype and *plesiotypes*.—Cat. Nos. 44057, 57293, U. S. N. M.

LEPTOTRYPA INFORMIS Ulrich. See *Cyphotrypa informis*.

LEPTOTRYPA? IRREGULARIS Nickles and Bassler. See *Stigmatella irregularis*.

LEPTOTRYPA MACULATA Ulrich. See *Spatiopora maculata*.

Leptotrypa minima Ulrich.

Leptotrypa minima Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 159, pl. 6, figs. 2-2b.

Maysville (Bellevue): Hamilton, Ohio.

Cotypes.—Cat. No. 43676, U.S.N.M.

LEPTOTRYPA OFFULA Ulrich. See *Paleschara? offula*.

Leptotrypa ornata Ulrich.

Leptotrypa ornata Ulrich, Jour. Cincinnati Soc. Nat. Hist., 6, 1883, p. 160, pl. 6, figs. 4, 4a.

Maysville (Corryville): Cincinnati, Ohio, and vicinity.

Cotypes.—Cat. No. 43678, U.S.N.M.

LEPTOTRYPA SEMIPILARIS Ulrich. See *Cyphotrypa semipilaris*.

Leptotrypa? sphærlion (Hall).

Paleschara? sphærlion Hall, 28th Ann. Rep. New York State Mus., doc. ed., 1874, pl. 8, figs. 14, 15.

Paleschara? (Chætetes?) sphærlion Hall, *ibid.*, mus. ed., 1879, p. 121, pl. 8, figs. 14, 15; 11th Ann. Rep. Indiana Geol. Nat. Hist., 1882, p. 247, pl. 7, figs. 14, 15.—Leesley, Geol. Surv. Pennsylvania, Rep. P 4, 1889, p. 592, fig.

Leptotrypa sphærlion Nickles and Bassler, Bull. U. S. Geol. Surv., 173, 1900, p. 299.

Niagaran (Waldron): Waldron, Indiana.

LEPTOTRYPA STIDHAMI Ulrich. See *Cyphotrypa stidhami*.

LESUEURILLA Koken. See *Maclurites Lesueur*.

LEVISIA Walcott.

Genotype: *Agraulos agenor* Walcott.

Levisia Walcott, Smiths. Misc. Coll., 57, no. 4, 1911, p. 86; Cambrian Faunas of China, Carnegie Institution, 3, 1913, p. 177.

Levisia nasuta Walcott.

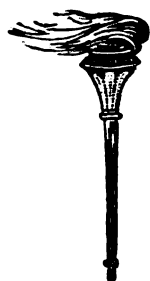
Levisia nasuta Walcott, Smiths. Misc. Coll., 57, 1911, p. 87, pl. 17, fig. 5, and figs. 7, 7a; Cambrian Faunas of China, Carnegie Institution, 1913, p. 178.

Ozarkian? (*Levis-erratic*): Point Levis, Quebec.

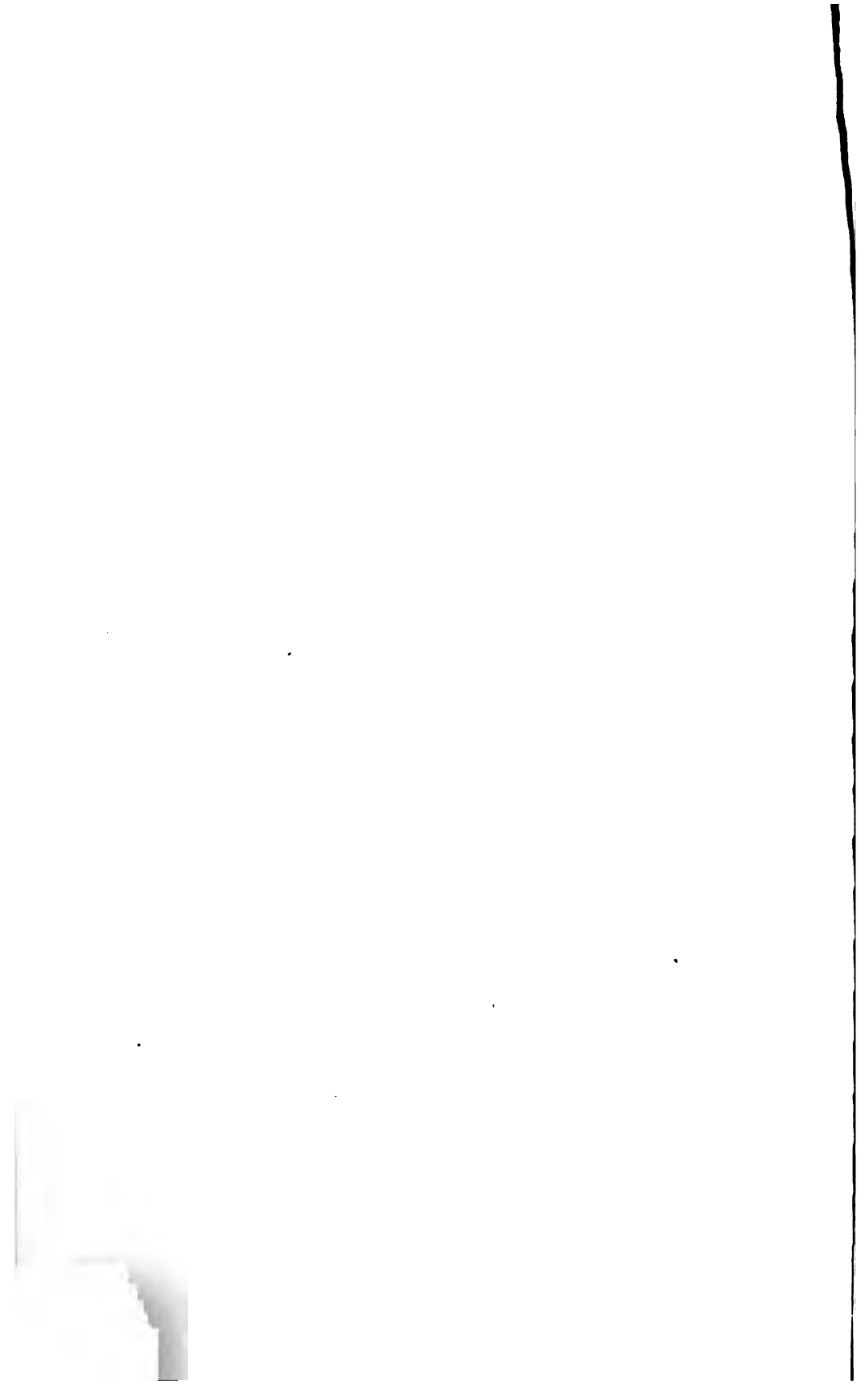
Levisia richardsoni Walcott.

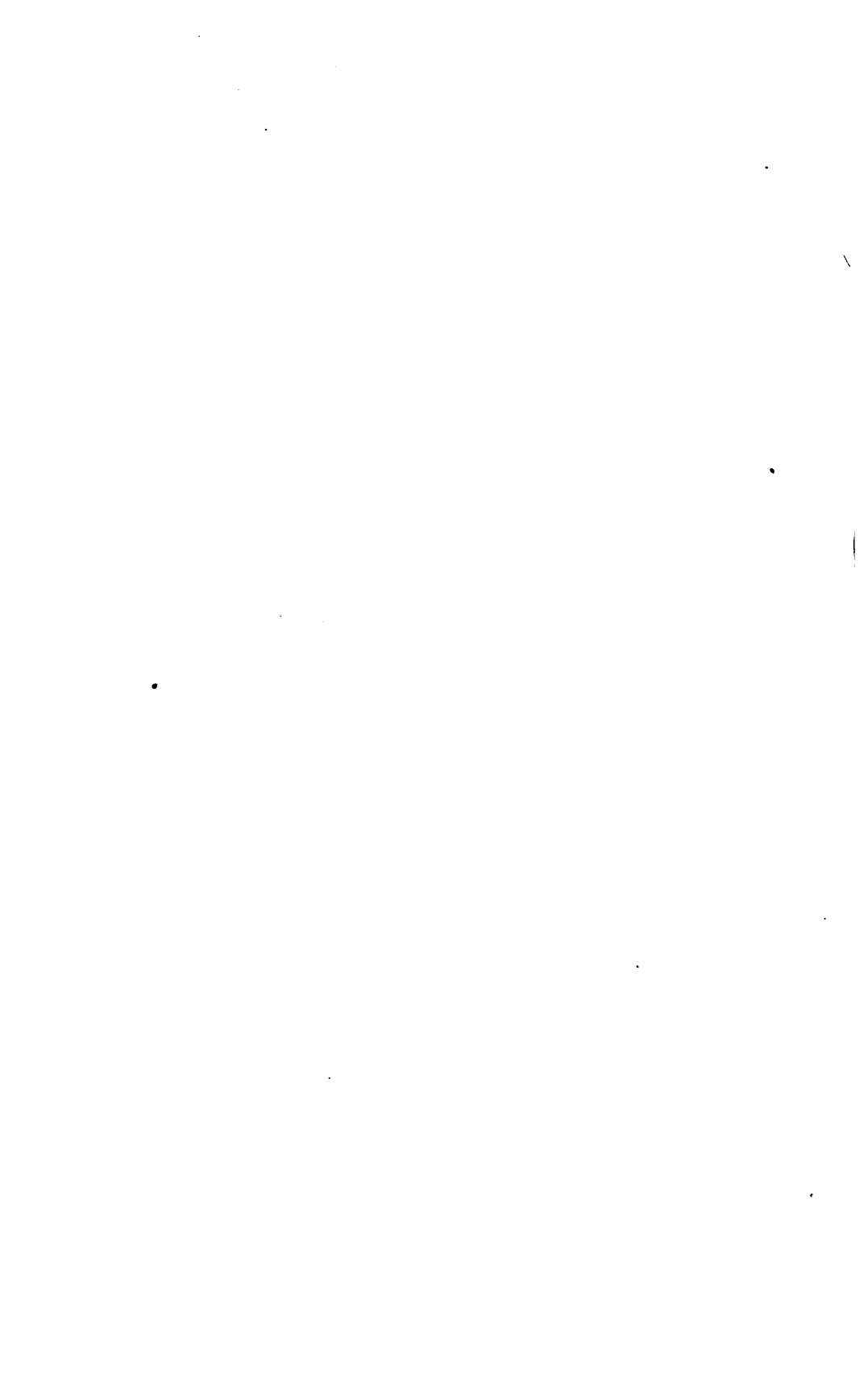
Levisia richardsoni Walcott, Smiths. Misc. Coll., 57, 1911, p. 86, pl. 17, figs. 4, 4a; Cambrian Faunas of China, Carnegie Institution, 1913, p. 178.

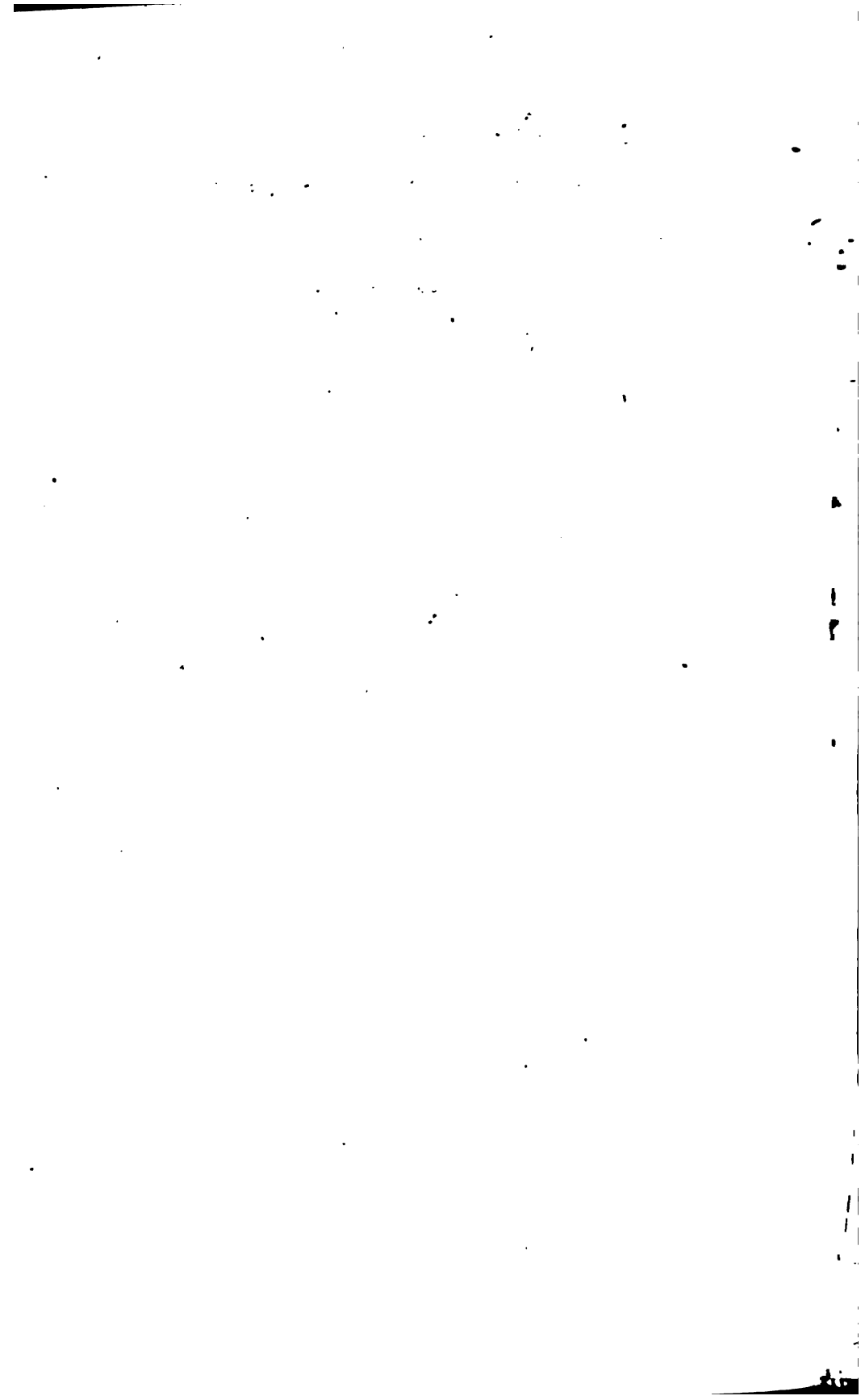
Ozarkian? (*Levis-erratic*): Point Levis, Quebec.











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